Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES

VOL. VII.---NO. 4. NEW YORK, JULY 26, 1862. NEW SERIES.

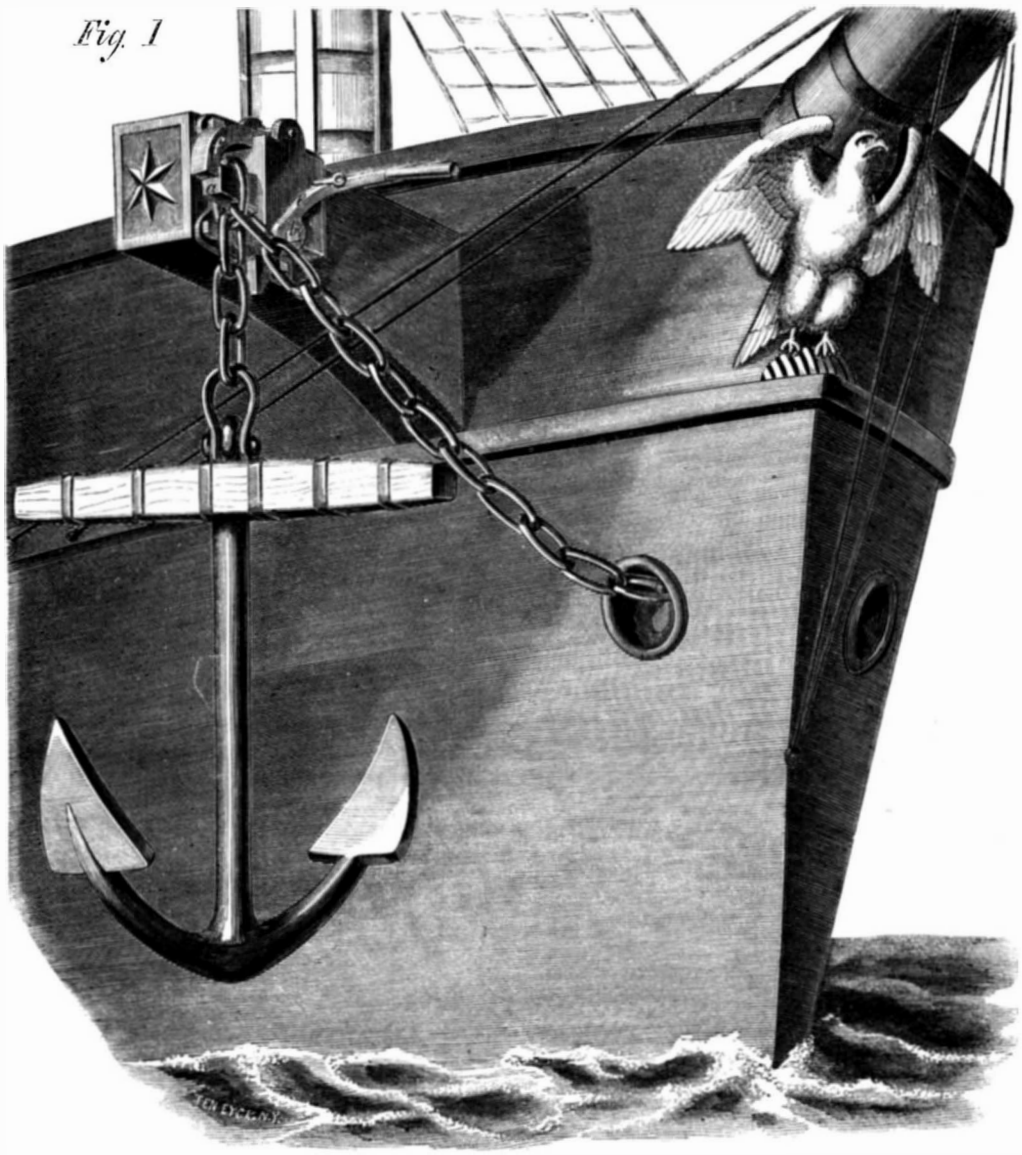
Improved Anchor Tripper.

The annexed engraving represents an improved device for releasing anchors from the cathead of vessels when the vessel is to be anchored.

An iron block is bolted to the side of the cathead, near its end, as shown in Fig. 1. This block is formed of two sides, bolted together, with an open space between them for the play of the moving parts, which are represented in section in Fig. 2. The anchor is suspended by one link of the cable on the bar, *a*; the link being prevented from slipping off by the hook, *f*; and the bar, *a*, is drawn back to drop the anchor by a cam on the shaft, *b*, of the crank, *e*. In each of the parts which form the sides of the apparatus, is an inclined slot, *c*, in which a block of brass is fitted to slide; these blocks being attached to the bar, *a*, by projections or pins, *d*, on the bar passing through holes in the blocks. The object of these slots and blocks is to guide the pin, *a*, obliquely downward, as it is withdrawn into the apparatus; the outer end of the bar at the same time falling and allowing the chain to drop from off it.

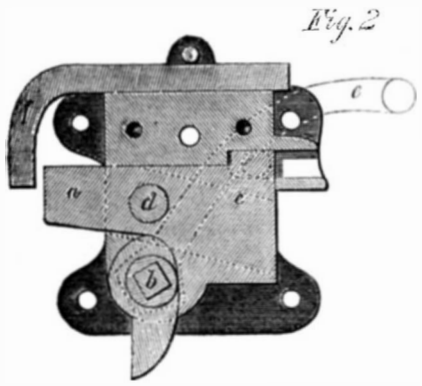
When the anchor is to be suspended from the tripper, a link of the chain is inserted in the recess opposite the front end of the bar (the bar being of course in its lowest position), the operator presses against the rear end of the bar, and 'pushes it upward and outward to the position shown; this also causes the cams and the handle to assume the proper position for supporting the bar.

Fig. 1



BAYLIES'S ANCHOR TRIPPER.

Fig. 2



Although the weight of the anchor has no tendency to turn the cams, and thus cause the bar to descend, a pin is usually employed to retain the handle in its place, to guard against accidents.

As the bar is supported by the cams on the shaft, *b*, when this shaft is turned the weight of the anchor aids in drawing back the bar, and, consequently, a heavy anchor may be dropped with as much ease as a light one.

The patent for this invention was granted through the Scientific American Patent Agency, April 19, 1859, and further information in relation to it may be obtained by addressing the inventor, Thos. L. Baylies, at Richmond, Ind.

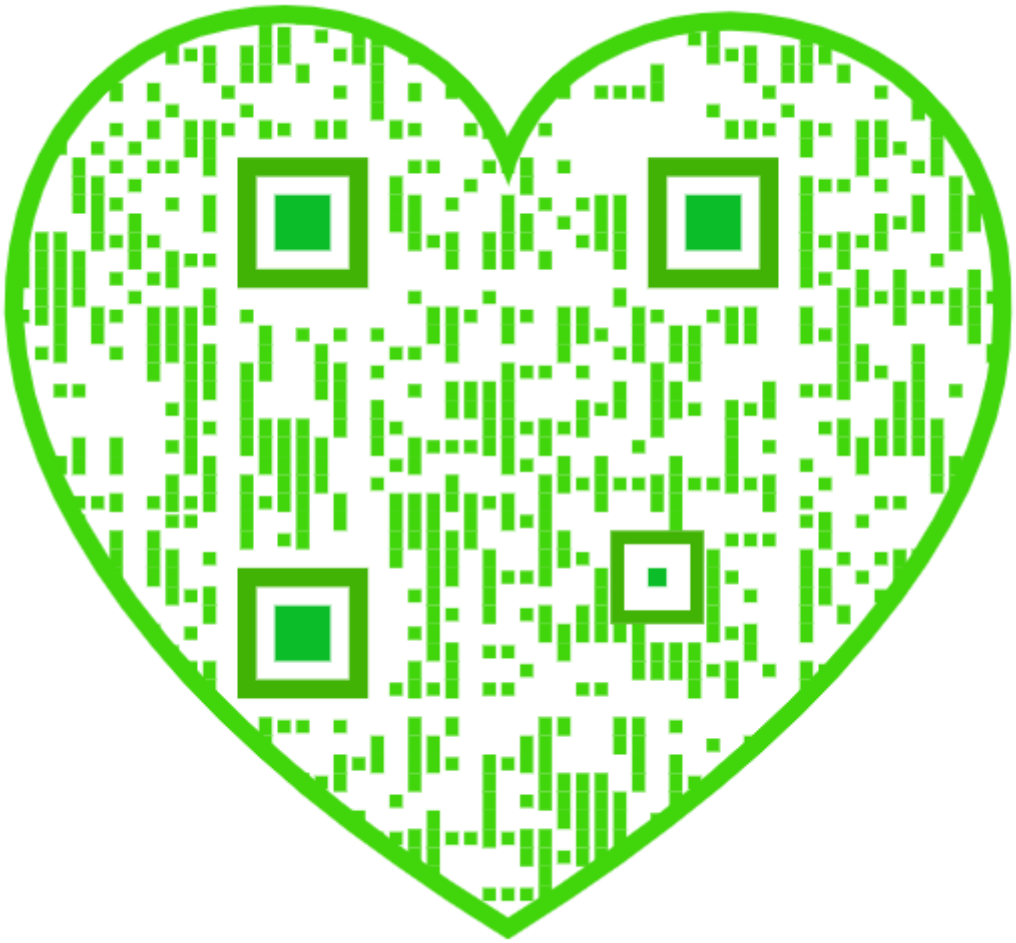
Interesting Objects in the Exhibition.

Entering the exhibition at the eastern dome, the first court on the right hand is devoted to New South Wales. Here will be found some thousand pounds worth of nuggets of pure gold and masses of auriferous rock, but the most noteworthy objects, which are sure to arrest the attention of the visitor, are the Golden Emu and the Golden Kangaroo, perched on a block of Malachite, cast in pure metal by a native artist. Adjoining this court is that of Queensland, the new Northern colony of Australia. Here are to be seen the dark green eggs of the Emu, which is veritably the bird of Australia. Then there are specimens of Myall, or violet wood, and a sachet box made of it. Put your hankerchief or gloves into it for a short time, and they will come out smelling most exquisitely of violets. A cone of the Bunya-Bunya tree is a curiosity; in form it resembles the cone of our fir tree, but it weighs about two pounds and is as large as a man's hat. Within it is a nut which at certain seasons the natives use as food.

Close at hand are the Bahama and the Haytian Courts. The shell-work ornaments made by Mrs. Gardner, of Nassau, Bahama, will be sure to delight the ladies. They consist of most beautiful head dresses, wreaths, bouquets, *négligés*, &c., a species of shell trinkets more beautiful than the ivory ware of Emanuel. Bahama may be termed the island or land of shells, for here we may see the great conch shell, the silver-lip shell, the leaf shell, the sun shell, and a hundred others. Then, too, there are the rare pink or rose-colored pearls, and sponges in infinite variety, including the great velvet sponge and the grass sponge. The water jugs of Hayti are an apparent paradox. They appear to have nothing but a hole in the bottom and a spout at the top, and are devoid of any ordinary aperture, such as we conceive necessary "to put water into a jug." However, when the Haytian lasses go for water to the well, it appears they press the jug into the stream and the water runs into the jug at the bottom, and can only come out again at the spout on the top. The interior of these jugs is of course not visible, so we can only guess that they are constructed upon the syphon principle. The comfort of such apparatus to the Haytians can only be conceived when it is remembered how insects and reptiles abound in that land; and that it cannot be pleasant to pour out a drowned fire fly or winged centipede, when longing for a drink of cool water, with the liquid into one's drinking cup. In Hayti we find the weakness of human nature indicated by the necessity for locks, but they are unlike our Hobbs and Chubbs; the locks of Hayti being made of hard wood of most ingenious construction, and well worthy of an inspection by some practical locksmiths.—*Septimus Piesse.*

LAST year 8,000 lbs. of strawberry, raspberry and blackberry jam were sold in San Francisco.

© 1862 SCIENTIFIC AMERICAN, INC.



NOTES ON MILITARY AND NAVAL AFFAIRS

GENERAL M'CLELLAN'S ARMY.

General McClellan's army is near Harrison's Landing, about four miles above the extreme point to which it retreated, and is employed in digging intrenchments.

ADDRESS OF GEN. POPE TO HIS ARMY.

We record the following common sense address of Gen. Pope to his army as one of the important events of the war:—

To the officers and soldiers of the army of Virginia:

By special assignment of the President of the United States I have assumed command of this army.

In but one instance has the enemy been able to place our Western armies in a defensive attitude.

I presume that I have been called here to pursue the same system, and to lead you against the enemy.

It is my purpose to do so, and that speedily.

I have spent two weeks in learning your whereabouts, your condition and your wants; in preparing you for active operations, and in placing you in positions from which you can act promptly and to the purpose.

I have come to you from the West, where we have always seen the backs of our enemies—from an army whose business it has been to seek the adversary, and to beset him when found—whose policy has been attack and not defence.

I am sure you long for an opportunity to win the distinction you are capable of achieving—that opportunity I shall endeavor to give you.

Meantime I desire you to dismiss from your minds certain phrases which I am sorry to find much in vogue amongst you.

I hear constantly of taking strong positions and holding them—of lines of retreat—and of bases of supplies. Let us discard such ideas.

The strongest position a soldier should desire to occupy is one from which he can most easily advance against the enemy.

Let us study the probable lines of retreat of our opponents, and leave our own to take care of themselves.

Let us look before us and not behind.

Success and glory are in the advance.

Disaster and shame lurk in the rear.

Let us act on this understanding, and it is safe to predict that your banners shall be inscribed with many a glorious deed, and that your names will be dear to your countrymen forever.

JOHN POPE,
Major-General Commanding.

RAIDS AT THE WEST.

We have accounts of several rebel raids in Missouri, Kentucky and Tennessee. The most important of these, is an attack of between 3,000 and 4,000 cavalry under Colonel Forrest, on 1,400 Union troops stationed at Murfreesboro', in the middle of Tennessee, about 32 miles southeast from Nashville. The attack was made on the 13th of July, and after a severe fight, a portion of the Union forces, the ninth Minnesota regiment of 800 men, and Hewitt's Kentucky Battery, manned by sixty convalescents, surrendered. It is hoped that Colonel Forrest will not be able to get back with his prisoners.

AFFAIRS AT VICKSBURG.

The bombardment of Vicksburg continues, and it is reported that water has been let into the canal, but without cutting out the channel as rapidly as was anticipated. We have doubted the success of this measure from the first. The Mississippi in its lower portion is very deep, and it is not easy to divert it from its channel.

THE REBEL STEAMER "SUMTER."

The steamer *Sumter*, captured at Memphis, is now being repaired at Cairo, and is said to be the finest vessel on the Western waters. One of her officers says she is a perfect monster, and for speed exceeds anything in the man-of-war line. She is over 200 feet long, has two heavy guns and splendid quarters. The bulwarks are from thirty inches to four and a half feet thick, all covered with two thicknesses of railroad iron She has two of the most powerful engines on the river, the cylinders being forty inches in diameter and eight and a half feet stroke. Her cabins are fitted out in fine style, with carpets, oilcloths, lounges, bathrooms, &c. The beautiful work about her gives evidence that Northern skill and mechanism have been chiefly employed in her construction. She was built in New Orleans.

GREAT UNION MEETING IN NEW YORK.

On Tuesday afternoon, July 15th, a meeting was held in New York city to express the feelings of our citizens in support of the Union. The concourse was immense, the whole square from Fourteenth to Seventeenth streets being densely packed. The numbers present were variously estimated at from 30,000 to 50,000. Speeches were made by men of all shades of political opinion, who vied with each other in expressing their devotion to the Union, and the most determined sentiments were most loudly applauded. Among the speakers were General Fremont, Peter Cooper, the Rev. Dr. Vinton, and the Rev. Dr. Hitchcock. Resolutions were passed expressing the most earnest determination to support the war and put down the rebellion.

THE PASSAGE OF THE CONFISCATION BILL.

The confiscation bill has finally passed both Houses of Congress by a large majority, and only wants the President's signature to be made a law of the land. It provides that if the rebels do not return to their allegiance within sixty days, their property, excepting slaves, shall be confiscated to the government, and their slaves shall be set free. This is the most important measure that has been adopted in this country since the Declaration of Independence. It is simply saying to the rebels, "We have been trying to coax you back for more than a year, and now the question of power is to be tried between us. If you are strong enough to fight the whole power of the North and to hold your slaves down at the same time, you may succeed in your mad enterprise, but if you are not, then shall your plantations be taken from you and given to our soldiers, and your negroes shall be set to work for them instead of for you." It will require a tremendous effort on the part of the nation to execute this law, but the result will be worth the effort. The one disturbing element in our civil polity will be removed. The power of that turbulent oligarchy which has caused us all of our foreign and domestic troubles, will be destroyed. The immesurable blessings of republican institutions—free schools, churches, literary societies, manufactures, industry, thrift, and all the amenities of life which naturally spring up in democratic communities, regard for the feelings, and respect for the rights of others will spread over the whole land. This great country will come forth from its terrible ordeal of fire and blood, with homogeneous society throughout all its borders. Knit together in bonds of good will among ourselves, and at peace with all the world, we shall move forward in a career of prosperity which will surpass even the marvels of our previous history.

The Proposed New Gun Boats.

The Boston *Commercial Bulletin* is severe upon the advertised proposals of the Navy Department for fifteen new gunboats. It says:—

The Navy Department have issued proposals for the construction and complete equipment of fifteen gunboats, whose speed shall not be less than thirteen knots! Now this reads well, and to those who are ignorant of nautical affairs conveys the idea of great energy on the part of our naval authorities; but to practical men it seems only another dodge to find an excuse for delay. Thirteen knots! Is there a vessel-of-war in the service, either propeller or side-wheel, capable of going at that rate? We answer, there is not one—not even the *Niagara*, a vessel which was designed expressly for speed. We will venture another assertion, viz., that there is not a gunboat in the world which can be propelled at the rate of 13 knots! And why? it may be asked. Because, to obtain speed there must be greater capacity than is assigned to a gunboat.

If the Navy Department believe that gunboats capable of being propelled 13 knots can be produced, why do they not make the models and furnish the requsite specifications by which to have them built? They modeled and designed the last gunboats, between six and seven hundred tuns each, and they have all been failures so far as sea-going qualities are concerned, and not one of them has yet performed even seven knots under steam alone! They are all too narrow, too wall sided, and draw too much water for shallow navigation; while at sea they roll so badly as to be valueless for accurate artillery practice.

We understand that the new gunboats advertised to be built, are not restricted as to size. The principal conditions are 13 knots speed, 6 feet draft of water, a certain capacity for coal, stores, &c., and that they are to be side-wheel boats. One of our mechanics who has responded to the proposals, says that his model represents fifteen hundred tuns, rather large capacity for a "gunboat," and that her sea-going qualities will be subordinate to her efficiency as a river boat. Our Bureau of Naval Construction must surely have some definite idea that vessels of the class required can be built; and if so, why do they not furnish themselves the proper specifications and models, and thus avoid all chance of failure? Probably these vessels are designed for some special service, at a particular season of the year—a service which the Government knows, and is therefore better qualified to make proper provision for, than outsiders. It seems that our Navy Department has no confidence in itself, outside of a certain antiquated routine, and, therefore, to avoid reponsibility, issues proposals, when it ought to act for itself.

Easter Eggs in Paris.

Passion week in Paris may be termed "the feast of eggs." Every good Catholic not only fasts every Friday throughout the year, but for a week together at Easter. The church does not allow at that time any flesh food; but eggs may be eaten in any quantity. On the first day of Passion week every body presents every one else with some little present emblematical of an egg in some shape or other, which is known as Paschal eggs (*œufs de Pâque*). Among a people so ingenious in trifles as the Parisians the opportunity is not lost, so that egg-shaped articles are to be had in every conceivable variety of material. One would think that the imperial eagle of France had summoned all the birds of the air to come to Paris, build their nests in shop windows, and there deposit their eggs; for, go where you will, look into whatever shop you fancy, there you see eggs from the size of a carraway comfit, such as is found in the nest of the humming bird, to one as large as a bowl—the ostrich or emu's egg. The toy shops are full of egg-shaped boxes; within them are dolls and play things. Here you have chocolate eggs full of cream where the yolk should be; there you have sugar eggs filled with liqueur; and again, ivory eggs, within which is a scent bottle. Passing along the streets are women with barrows, crying aloud, "*Des œufs! des œufs!*" eggs! eggs! On their perambulating boards are piled two lots of eggs, one white, natural; the other red, cooked in logwood water. Thus red eggs, ready boiled, are sold in every street in Paris; and *Œufs rouges* is the synonym of *Œufs de Pâque*, both in their literal sense, meaning Paschal or Easter eggs, and in the more acceptable one, the presents usually given at Easter time. Some of the nests are beautiful works of art: Here is a stoat or weasel stealthily climbing up a tree to suck the eggs, with the parent bird in battle array, ready to drive the intruder away. There again a cuckoo has turned out a little chaffinch's egg, which lies broken on the ground below, while she has left her own for a foster-parent to hatch. Altogether Easter eggs in Paris are one of its sights, and well worth seeing.—*Septimus Piesse.*

Wool Exhibition.

The Ohio State Agricultural Society has made arrangements to have a great exhibition of wool at its fair, which is to be held at Cleveland, September 16th to the 19th. The Ohio *Farmer* says, "four classes have been arranged, comprising felting wools, delaine wools, cassimere wools and combing wools. In each class there are to be three premiums, of $20, $10 and $5, respectively. None but actual growers are allowed to exhibit, and competition is open to all parts of the United States and Canadas. Samples must contain not less than twenty fleeces. The Awarding Committee are partly composed of experienced Eastern manufacturers and practical Western wool men. A capacious building will be erected for the converience of exhibition, and a wool sale at auction will close the fair on Friday afternoon."

AGRICULTURAL DEPARTMENT.—The "Department of Agriculture," incorporated by a late act of Congress, is to go into immediate operation. Isaac Newton, Esq., of Pennsylvania, the head of the recent agricultural department of the Patent Office, is the commissioner under the new law. Richard C. McCormick, of New York, will fill the position of chief clerk. The department is in accordance with the suggestion of the President in his annual message, and the establishment of a distinct bureau or department devoted as a leading purpose to the agricultural interest, has been discussed more or less for the last twenty years.

IN 1846 the mines of Lake Superior yielded copper to the value of $830; last year—1861—they produced $3,009 000 worth of copper.

© 1862 SCIENTIFIC AMERICAN, INC.

THE HANDSOMEST FIRE ENGINE EVER BUILT.

We have just examined the handsomest and we think the best fire engine that has ever been built. It was constructed by Cowing & Co., of Seneca Falls, N. Y., for Columbus company of this city. The box is made of rose wood inlaid with mother of pearl, and the iron is all cold blast, charcoal Lake Superior metal, costing $150 per tun—a better iron even than the famed Low Moor. The scroll ornaments on the forward bolster with their connections form the finest specimen of forging that we have ever seen. But it is for the workmanship and arrangements of the working parts that the makers claim the greatest superiority. The suction hose is carried in a beautiful case over the middle of the engine, with its end attached ready for work without any delay; the valves are of simple construction, and accurate fittings; and novel provisions are made to diminish the concussions and render the working smooth and noiseless. The builders of this engine have long been famous pump makers and they now construct other machinery in the same thorough manner. We hope to be able to present an engraving of this new fire engine to our readers in a few weeks.

To Make Superphosphate of Lime.

This is the season of the year when preparations should be made for the manufacture of this valuable manure. It is a product, which, as stated by Professor Anderson, of Edinburgh, depends on the existence of two different compounds of phosphoric acid and lime, one of which contains three times as much lime as the other. That which contains the larger quantity of lime is found in the bones, and all other natural phosphates, and is quite insoluble in water; but when two-thirds of this lime are removed it is converted into the other compound, which is exceedingly soluble. This change is effected by the use of sulphuric acid, which combines with two-thirds of the lime of the ordinary insoluble phosphate of lime, and converts it into biphosphate of lime, which is soluble. If to 100 lbs. of common phosphate of lime the requisite quantity of oil of vitriol be added, 64 lbs. of biphosphate, containing the whole of the phosphoric acid (the valuable constituent) are obtained, the remaining 36 lbs. consists of lime, which, combining with the sulphuric acid, produces 87 lbs. of dry sulphate of lime, or 110 lbs. of the ordinary sulphate or gypsum. This is the minimum quantity which can be present, but in actual practice it is liable to be greatly exceeded. By employing a sufficiency of sulphuric acid, the whole quantity of phosphoric acid in the phosphate may thus be brought into a soluble state, but in actual practice it is found preferable to leave part of it in an insoluble condition, as where it is entirely soluble its effect is too great during the early period of the season, and deficient at the end. In order to dissolve bones, bone ash, or mineral phosphates, they are mixed with from a third to half their weight of sulphuric acid of specific gravity 1.70 (140° Twaddle). When mineral phosphates, and particularly coprolites, are used the quantity of sulphuric acid must be increased, so as to compensate for the loss of that which is consumed in decomposing the carbonate of lime they contain. When operating on a small scale, the materials are put into a vessel of wood, stone, or lead (iron is to be avoided as it is rapidly corroded by the acid), and mixed with from a sixth to a fourth of their weight of water, which may, with advantage, be used hot. The sulphuric acid is then added and mixed as uniformly as possible. Considerable effervescence takes place, and the mass becomes extremely hot. At the end of two or three days it is turned over with a spade, and after standing for some days longer, generally becomes pretty dry. Should it still be too moist to be sown, it must be again turned over, and mixed with some dry substance to absorb the moisture. For this purpose everything containing lime or its carbonates must be carefully avoided, as they bring back the phosphates to the insoluble state, and undo what the sulphuric acid has done. Peat, sawdust, sand, decaying leaves, or similar substances, will answer the purpose, and they should all be made thoroughly dry before being used. An excellent plan is to sift the bones before dissolving, to apply the acid to the coarser part, and afterward to mix in the fine dust which has passed through the sieve, to dry up the mass.

Safe Working Pressure of Boilers, and Hooping of Flues.

Mr. L. E. Fletcher, the Engineer of the Manchester (England) Association for the prevention of steam boiler explosions, in his monthly report says:—

For some time since I have been desirous of touching upon the point of safe working pressures for boilers, since it not unfrequently happens that it is necessary to warn our members on account of excess.

The scale adopted by the association as a general standard is as follows:—For shells of boilers 7 feet in diameter, made of $\frac{3}{8}$th plate, the safe working pressure is 50 lbs.; if of $\frac{7}{16}$th plate, 60 lbs.; and other dimensions in proportion. This allowance corresponds with the general practice of the manufacturing engineers of the district, is quite as high as the standard in other parts of the country, and considerably in excess of that permitted either in France, Holland, or Belgium, by their respective Governments. It must, however, be distinctly understood that this standard should not be applied arbitrarily in every case, without any allowance being made for the attendant circumstances. It is only applicable in cases where the boiler is well made, both as regards materials and workmanship, and where the condition of the plates is good. It would be highly dangerous to apply it to boilers weakened by the wear and tear of years; while, on the other hand, a new and thoroughly well made boiler might for a time be allowed to work at a pressure slightly in excess of that given. But this could only be safe where everything is in first-rate condition.

It is a very common idea that the bursting pressure of a boiler is six times as high as that given above as its safe working pressure. This, however, I am pursuaded is a great mistake, and leads in many cases to undue confidence. I am confirmed in this conclusion by the constant examination of the rent plates in boilers that have exploded, where I find that, even where explosion results from thinning of the plates, rupture ensues long before they are reduced to one sixth of their original thickness, and in one case I knew a well made and nearly new boiler, in first rate condition, to explode, on account of only a comparatively slight increase of pressure, which had accidentally been allowed through an error in the steam gage. In this case, that at which the boiler actually burst did not exceed its ordinary working pressure by more than 50 per cent, the one being about 90 lbs., the other about 60 lbs. I believe that an application of anything like six times the pressure given in the scale above would burst most of the boilers in Lancashire, and where it has been actually attempted by hydraulic pressure, the steam domes have been found to tear off long before the strain referred to has been attained. I cannot, therefore, think that shells of cylindrical boilers can be worked without risk at a higher pressure than that given in the preceding scale, unless under very exceptional circumstances.

With regard to the furnace tubes which are exposed to external pressure, I am glad to find that the practice is becoming increasingly general of strengthening them either with flanged seams of hoops, the hoops being made either of angle iron, T-iron, or other approved form; and since it too frequently happens that flues are not made in the first instance truly cylindrical, on which their strength so much depends, and that other sources of weakness creep into the manufacture unawares, it is extremely desirable that no new boiler should be constructed with flues unstrengthened in the way just described, however slight the working pressure may be.

THE correspondent of the *London Engineer* states that the lock merchants of Wolverhampton, England, are congratulating themselves that they have been able to imitate American porcelain door knobs. He says "hitherto the English makers have been unable to compete with the American makers of this article. Now, however, Messrs. Harper & Tildesley have, with the help of a pottery firm, succeeded in producing it in its entirety." The door knobs hitherto used in England have been made of brass; the porcelain knobs can be made at fifteen per cent less cost.

THE London *Engineer* states that there is a talk of altering all the Armstrong 110-pounders from breech to muzzle loaders.

Caution to Experts.

At the assizes of Stafford, in England, Mr. Timmens brought an action against the Birmingham Gas Company, to recover damages for injury caused by the infiltration of water from the gasometer into his wells. The company summoned Dr. Letheby, an eminent chemist, and one of the members of the Sanitary Committee of London, who on discovering animalcules in the water testified that it could not be mixed with water from the gasometer, as it was impossible for any animal to live in water even very lightly impregnated with gas. But the plaintiff called two other chemists, who exhibited in court a gudgeon swimming vigorously in a vase containing 25 ounces of pure water, mixed with half an ounce of water taken from the reservoir of a gasometer. The jury rendered a verdict for the plaintiff.

The Gunboat Essex.

The gunboat *Essex*, which figured largely in the engagement at Fort Henry, where she was damaged, is again ready for active service, and has made a recent trial trip at St. Louis.

The *Essex* returned to St. Louis from Tennessee river on the 23d of February, to repair the disaster she had sustained at Fort Henry, and to be protected against a similar one in the future. She was lengthened 40 feet, had her boilers and machinery placed below water line, and her casemates raised from 6½ to 17½ feet in hight. She received entire new boilers, and was generally reconstructed. This is the third reconstruction the boat has undergone, and altogether her cost to the government amounts to $91,000, which is $20,000 less than that of any other of the gunboats built in the West. Her officers claim for her that she will be found more effective than any of the new boats.

The armament on board is as follows:—Three 9-inch Dahlgren shell guns, one 10-inch Dahlgren shell gun, two 50-pound rifled Dahlgren guns, one long 32-pounder, one 24-pound howitzer.

Her forward casemate of wood, 30 inches thick, is plated with india rubber 1-inch thick and 1¾ inch iron; side casemates—of wood—16 inches thick, plated with 1-inch india rubber and ¾-inch iron. The roof is bomb proof. The pilot house is of wood, 18 inches thick, plated with 1-inch india rubber and 1¾ inch iron. She has false sides, which render it impossible for anything like a steam ram to attack her effectively. Her hull cannot be reached by any such contrivance, and even if it could, the water-tight compartments, into which the hold is divided by bulkheads—being forty in number—would render the sinking or otherwise disabling of the boat by collision an impossibility. If one or more of the compartments should be broken into, the disadvantage to the craft from taking water would be comparatively slight.

Death of an Inventor.

We regret to state that Mr. Hiram W. Brown, inventor of the improved cotton gin, described on page 26 of this present volume SCIENTIFIC AMERICAN, met with a sudden death on the 11th inst., in South Brooklyn. He was caught in the belt of one of the cotton gins and literally torn to pieces. He was a very ingenious and skillful mechanic, and was highly respected by all persons who were acquainted with him.

THE gold-seekers who left Boston for Nova Scotia a few weeks ago have returned disgusted. They found a large number of miners there, and claims had been taken up and worked, but it was soon evident that gold could not be obtained in such quantities as would justify a large emigration from the United States.

THE agent of the Don Pedro, 2nd Railway Company in Brazil, has contracted for six American locomotives to be built by Baldwin and Co., of Philadelphia. The grades on this railway are 98 feet per mile, for 15 miles, and the least radius of curvature 730 feet. The engines are to be of Baldwin's ten-wheeled type, weighing 30 tuns. Thus far, no American engines have been sent to Brazil.

A WHITWORTH 12-pounder shot has attained an initial velocity of 2,200 feet per second, which is about 500 feet greater than that of a musket rifle bullet.

© 1862 SCIENTIFIC AMERICAN, INC.

Improved Clothes Dryer.

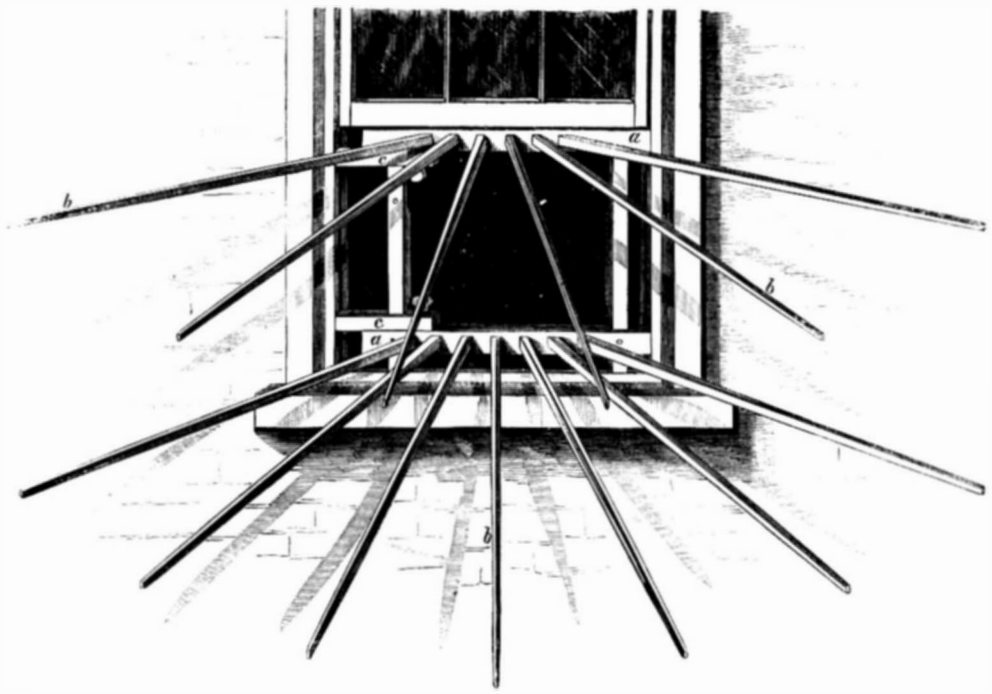
"Accidents will happen in the best regulated families." On page 288 of our last volume we published an engraving of McNeil's Clothes Dryer, but by some strange blunder the model was given to our artist with the bars inserted in the wrong side of the frame, so that they crossed one another in a very bewildering and useless manner. In justice to the inventor we have had a second engraving made, which we now publish.

A light but strong frame is made of wood, with mortises through the upper and lower bars, *a a*, of such size as to permit the passage of the slender tapering bars, *b b b b*, the larger ends of these bars being of sufficient size to just fill the mortises. The lower sash of the window is raised, and the frame is fitted into the opening, with the bars, *b b*, extending outward, and spreading apart at their outer ends, as shown; the mortises being made in the proper directions to effect this spreading. The clothes are then hung upon one bar after another, in succession, and secured by pins, when each bar is inserted into its mortise or pushed through it from the smaller end as the clothes are hung.

The frame is secured in the window in a very simple and easy manner.—Notches are cut in the ends of the bars, *a a*, to grasp the stop of the window frame on one side, and there are similar notches in the ends of the extension bars, *c c*. When the ends of the bars, *a a*, are placed, the extension bars, *c c*, are pushed outward till they grasp the stop on the opposite side of the window, when they are secured in place by set screws.

The length of the 13 bars, *b b*, combined, is 70 feet; sufficient to hold all the linen of a small family, and the position of these bars, with their spreading ends, exposes the clothes freely to the air. The apparatus may be turned inward in wet weather, or it may be attached to the wall; and when not in use it can be packed away into a very small compass. Being made of wood it can be constructed at very small cost, and will doubtless prove a great convenience to a large number of families.

The patent for this invention was granted through the Scientific American Patent Agency, February 11, 1862, and further information in relation to it may be obtained by addressing the inventor, Gordon McNeil, at Chestnut Hill, Philadelphia.



M'NEIL'S CLOTHES DRYER.

PETROLEUM—EXPERIMENT TO DETERMINE ITS COMPARATIVE ILLUMINATING POWER WITH GAS AND CANDLES.

Number III.

It is not the difference in price per gallon between two burning fluids, or other agents employed in artificial illumination, that determines their respective cost for use. One burning fluid, such as a mixture of alcohol and turpentine, that costs only sixty cents per gallon, may be more expensive than sperm oil costing one dollar and a quarter; because the latter possesses three times the illuminating power of the former. It is well known that refined petroleum has lately driven all other burning fluids out of use, and one reason for this is its very low price. But, as we have already stated, this cannot determine its economy—its comparative illuminating power must also be known to form a just estimate of its cost. Heretofore this has been unknown, but now we have a most valuable contribution to science in the record of a series of experiments conducted by Professor James C. Booth and Mr. Thomas H. Garrett, of Philadelphia, and published in a late number of the Journal of the Franklin Institute. Their experiments were chiefly instituted to test the comparative illuminating power of petroleum and the common coal gas used in Philadelphia. The gas was measured by a water meter, and the jet used was a fishtail burner attached to the top of the meter, and fixed at the uniform distance of six feet from the photometer. The lamp for burning the fluid and giving equal light to the gas jet, was measured on the opposite side of the photometer. Messrs. Booth and Garrett first determined by experiment the relative economy of several coal and mineral oils, and common burning fluid (alcohol and turpentine). Of four kinds of mineral oils, or refined petroleum, there was but little difference in their illuminating power. It was found that 2.599 gallons gave a light equal to 1,000 cubic feet of gas, and it required no less than 11.699 gallons of burning fluid to produce an equal amount of light; thus proving that one gallon of petroleum is equal to four of burning fluid for giving light. Various experiments were also made with flames of different shape in the petroleum lamp, to determine which form gave the most intense light with the least quantity of oil. It was found that a clear, straight cut of the wick gave the best results. The most common way of trimming such lamp wicks is with an arched cut, to produce a flame shaped like a bow. With a flame from a wick cut straight across, 2.576 gallons of oil gave a light equal to 1,000 cubic feet of gas, while with an arched flame, 2.846 gallons of oil were required. Very great care must be observed in trimming the wicks of oil lamps, so as not to leave them ragged at the edges. A loss varying from four to twenty per cent was observed with different trimmed wicks. Messrs. Booth and Garrett say on this head, "The best method of obtaining the fullest amount of light, is to trim the wick straight across, and test the shape of the flame until it presents as even a top as practicable."

Experiments were also made to determine the relative illuminating power of gas and paraffine, a spermaceti and adamantine candles. It was found that it required 35.53 pounds of paraffine candles to produce a light equal to 1,000 cubic feet of gas; 41.16 pounds of spermaceti, and 47.18 of adamantine. A very great loss of light results from permitting beads of smoke to accumulate on the ends of candle wicks. The relative cost to produce an equal amount of light, is also given in the paper of Messrs. Booth & Garrett. For 1,000 cubic feet of gas, the price in Philadelphia is $2 10; for 2⅝ gallons of refined petroleum (at 45 cents per gallon) $1 07; for spermaceti candles, $18 50; for paraffine candles, $11 68; for adamantine candles, $11 75. There can be no question, therefore, judging from these experiments and statistics, that petroleum is the cheapest known agent of artificial light. Against its common use, however, it may be said that it is dangerous, being liable to explode. It is not, indeed, so dangerous as alcoholic burning fluids, still it is dangerous when by improper distillation, or the cupidity of the manufacturer, the light, volatile fluid called benzine is permitted to remain in the oil. All petroleum lamps should be filled during day, and the oil should be kept in a cool place. The following advice is given to gas companies:—"We leave it to gas companies to resolve this question, or its alternative, whether the extraordinary comparative cheapness of mineral oil illumination will not stimulate invention to contrive ways of burning the oil, or of making gas from it in a small way, so as to obviate every objection to its use, and so supersede the use of company-made (coal) gas."

Sewage of Cities---Slow and Fast Crops.

Much has been said and written respecting the value of sewage in cities for manuring lands, and even agriculturists, like Mr. Mechi of London, have exalted its properties to a wonderful extent, without giving the public much practical information on the subject. One well qualified to give it a complete investigation has taken hold of it at last, in the person of Professor Voelcker, of the Chemical Department of the Agricultural College at Cirencester. In a paper lately read before the Royal Agricultural Society, he said, the general conclusion at which he had arrived, was, that although it might be very desirable for grass crops, it was next to useless for arable land or green crops, or even for market gardens. The value of sewage could only be ascertained experimentally on the field. Present experience only went to show that, according to the soil and other conditions, the town sewage of Edinburgh, which is rather more condensed than that of London, was worth only from ½d. to 1¼d. per tun. In applying sewage, it was better to allow the deposit of suspended matters, and use only the clear liquid. As he had said, the only crops to which they could apply sewage to advantage were grass crops, and then it must be applied in great quantities and at the particular time when it was required. It should be applied, if possible, by gravitation and open irrigation, for no soil had the power of laying up in its body the greater part of the soluble fertilizing constituents. On poor sandy soils, the excrementitious matters of sewage were of great utility; but, in reference to good clay soils, water was the most valuable portion of the sewage, the fertilizing matters being in that case of little or no importance, in fact, hardly worth calculating; whereas, on light, poor sandy soils, the value of sewage rose or sank with the amount of fertilizing matter applied to the land. So far from sewage being a great fertilizer of vegetable gardens, it certainly would not pay for the machinery and pipes necessary to bring it even from a short distance, and spread it on the ground. Any thing that was grown very quickly, was inferior in quality to the same kind of thing which was grown more slowly. Quickly-grown grass, for instance, was far more crude than that which was grown slowly—extreme rapidity of growth being always attended by inferiority of quality; but, of course, it was quite another thing whether it was not more profitable to producers to have the large increase in quantity, although it was attended by some degree of inferiority.

THE Baltimore *American* describes a new steam fire engine, built by Messrs. Poole & Hunt of Baltimore, for Guayaquil, Ecuador, South America. The steam cylinder is 11 inches in diameter with an 8-inch stroke.

THE Danish Government has sent a steamer to London with 200 young engineers and artists to visit the Exhibition and English manufactories. The Government assumes the whole of the expenses

© 1862 SCIENTIFIC AMERICAN, INC.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular monthly meeting of the Association was held at its room at the Cooper Institute on Thursday evening, July 10, Prof. Seely in the chair.

SELF-REGULATING GAS BURNERS.

At a previous meeting Mr. Thompson had exhibited to the Association his automatic gas regulator. As illuminating gas issues from a burner of given size with different velocities under different pressures, and as the pressure at the burner in ordinary dwellings is subject to constant variations, many efforts have been made to devise an apparatus which would deliver a constant flow of gas notwithstanding these variations of pressure in the pipe. Some of the plans have been illustrated in the SCIENTIFIC AMERICAN, and as Thompson's could be made intelligible only by means of engravings, which there is no time to prepare, we are forced to omit Mr. Churchill's able report in relation to it.

SELF-REGULATING WINDMILL.

Mr. STEVENS presented a plan of a windmill in which the power is to be regulated by a weight, but the plan could be understood only by means of engravings.

MEASURING THE FORCE OF GUNPOWDER.

Prof. SEELY—A gentleman called on me yesterday with a newly-invented gunpowder, and in the course of conversation we had a discussion in regard to the mode of measuring the power of powder. I will suggest to the association this plan. Introduce a pipe through the wall of a strong cylinder near its lower end, and bending the pipe at an elbow let it rise by the side of the cylinder. Pour some water into the cylinder—more than enough to cover the end of the pipe. Then close the cylinder perfectly tight with the exception of a hole through the cover, through which a pistol may be discharged into the interior. Will not the force of the powder be measured by the rise of the water in the pipe; the expansion of the gases by the hight to which the water rises, and the rapidity of the expansion by the time in which it rises?

Mr. DIBBEN—I should doubt the accuracy of this mode. The inertia of the water would cause some time to be consumed in moving it, and during this time the walls of the cylinder would be conducting heat away by convection; diminishing the amount of expansion. I have had a good deal of experience in testing powder with the ordinary *eprouvette* and I have found the results with the same samples of powder very variable, and the effect of small charges a very uncertain indication of the effect of large charges. The *eprouvette* is a small cannon with the bore very accurately turned and a chamber in the breech to hold a given quantity of powder, generally an ounce. The ball is turned to fit the bore nicely, the charge is weighed and poured into the chamber through a tube, so that it may all go into the chamber, and the breech is made concave to fit the ball; affording no space between the powder and the ball. The cannon is set at an angle of 45°, and the distance to which the ball is thrown is taken as a measure of the force of the powder used. But I have found that two samples of powder taken from the same barrel, and from the same half pound in the barrel, would throw the ball to quite different distances, varying sometimes 20 per cent. It is found that with the full service charge in large cannon, the range with the same samples of powder is much more nearly uniform.

Prof. SEELY—The products of the combustion of gunpowder burned under different temperatures are entirely different, and as the temperature varies with the pressure, the force exerted would be affected by the ease with which the shot was moved. This fact suggests the great number of elements which come into an experiment to determine the force of any particular sample of powder, and, consequently, the difficulty of making the investigation.

MODES OF RAISING WATER.

The regular subject of the evening, "Modes of Raising Water," was then taken up.

Prof. SEELY—I proposed this subject from a selfish motive—the hope of getting some information in relation to it. I shall open it with a few very elementary remarks. Raising water is the same as raising any other substance, the power required is in direct proportion to the weight raised, and the hight to which it is raised. The object of most of our devices is to avoid expending power in the production of incidental effects, as the overcoming of friction, &c. The first plan adopted was doubtless that of dipping up the water in a bucket or other vessel, and perhaps this is more economical of power than any other plan that has ever been devised. The amount of friction is inappreciable. When wells were too deep to be reached by the arm, it was necessary to let down the bucket with a rope, and if a large bucket was used, it was found convenient to attach it to a lever with a partially counterbalancing weight at the opposite end of the lever, and thus the sweep came into use. Or the rope was passed over a drum with a smaller drum on the same shaft for the counterbalancing weight. But when wells were dug in dusty cities it was necessary to cover them over, and pumps had to be used. These are simply plans for lifting the water, the bucket being made small and attached to a rod instead of a rope. In this case there is a great increase of friction, requiring a larger expenditure of power. I should like to hear from gentlemen present an account of the more complicated plans that are now employed.

Mr. FISHER—I have a plan for taking water from a ship, which has not been suggested by any one else that I am aware of. It is to run a pipe from the hold of the vessel out of the stern, when the forward motion of the vessel would cause the water to flow out through the pipe. I have made some calculations which show that a speed of 20 miles an hour would discharge the water under at least 4 feet head, making very large allowance for friction, &c.

Mr. DIBBEN—The calculations may be all right, but I suspect there would be practical difficulties in the way of arranging the pipes. Ship masters too have very strong objections to making holes in the sides of their ships. They are very much disinclined to adopt any alterations in their pumps. I have seen ships within a short time with the pump on the hurricane deck, so that all the water had to be raised twice as high as was necessary. There is nothing that mariners are more afraid of than getting their pumps choked, as they are always liable to be from coal, dust, &c., and any new pump is subject to suspicion that it may be faulty in this respect. Some vessels have a well specially constructed to set the pump into, to prevent this danger.

The subject was farther discussed, and it was voted to continue it at the next meeting. The Association adjourned to the second Thursday in August.

VALUABLE RECEIPTS.

SILVERING BY POWDERED TIN.—A quantity of pure tin is melted and poured into a box, which is then violently shaken; the metal assumes when cold the form of a very fine gray powder. This is sifted to separate any coarse particles, and is mixed with melted glue. When it is to be applied it should be reduced by the addition of water to the consistence of thin cream and is laid on with a soft brush like paint. It appears when dry like a coat of gray water color, but when it is gone over with an agate burnisher it exhibits a bright surface of polished tin. If the glue is too strong the burnisher has no effect, and if too weak the tin crumbles off under the burnisher. A coating of white or gold-colored oil varnish or lacquer, is immediately laid over it, according as it may be intended to imitate silvering or gilding. This kind of gilding is often used for covering wood, leather, iron or other articles in constant wear. It is very ornamental.

COMPOSITION FOR WELDING CAST STEEL.—Take ten parts of borax and one part of salammoniac; grind them together and fuse them in a metal pot over a clear fire, taking care to continue the heat until all spume has disappeared from the surface. When the liquid appears clear, the composition is ready to be poured out to cool and concrete, when it is ground to a fine powder and is ready for use. To use this composition the steel is put into the fire and raised to a bright yellow heat, it is then dipped among the welding powder, and again placed in the fire until it attains the same degree of heat as before, when it is ready to be placed under the hammer.

TO PREVENT THE RAVAGES OF THE WOOLEN MOTH.—The ravages of the woolen moth may be prevented in a measure by the use of any of the following substances; tobacco, camphor, and perhaps the most agreeable for wearing apparel, a mixture of one ounce of cloves, one ounce of rhubarb, and one ounce of cedar shavings, tied up in a bag, and kept in a box or drawer. If the substance be dry, scatter it in the folds of the cloth, carpet, blankets, or furs; if liquid scatter it freely in the boxes, or on the cloth or wrapper, laid over and around it.

PAINTING GLASS TRANSPARENCIES.—Provide a small muller and a piece of thick ground glass five or six inches square to grind the colors on, also a small pallet knife and a few bottles to put the colors in. For a red color get a little scarlet lake, and for blue a little Prussian blue. For green use purified verdigris ground with a quarter of its bulk of gamboge, and for brown use burnt umber, and for black, burnt sienna black. These colors are truly transparent. Having all these colors ready, grind them in the balsam of fir mixed with half its bulk of turpentine; mastic varnish will do very well, but the balsam is the most beautiful. To coat the glass black round the painting, dissolve asphaltum in turpentine and mix with lampblack. When the colors are all ground they must be put in separate bottles and sealed, and when they are to be used, a little bit is taken out at once on a piece of glass, just as much as is needed at once, as it quickly dries. If the color is too thick it must be diluted with turpentine. To paint glass sliders, the subject must be designed on paper and the paper put under the glass and the glass painted above it according to the design on the paper underneath.

VARNISH FOR WOOD PATTERNS.—The most simple varnish, combined with adaptation, is the following:—1 quart of alcohol and a quarter of a pound of gum shellac. This put into a bottle and when wanted for use mix up with a little lampblack to about the thickness of cream and varnish the pattern over, rubbing it into the grain of the wood, until a slight friction produces a polish. This varnish makes a smooth surface on the pattern, rendering it more easily drawn from the sand, and it fills up all pores or worm holes that may be in the wood, consequently a cleaner and smoother casting is produced.

A New Method of Manufacturing Wine.

It has often been remarked that in countries where cheap, light wines are abundant, dram drinking is much less common than in those countries where such wines can not be had. If this be really a fact—and we are unable to bring forth any data to contradict it—an invention such as that which we are about to describe, will prove to be a great blessing for the United States.

The object of this invention is to produce a good, cheap and light wine, particularly for the poorer classes of the people, from the juice of various fruits and berries, an almost fabulous supply of which can be obtained from the fields, from the woods and from the gardens and orchards in this vast country. The juice of some of these berries, such as gooseberries, elderberries, currants, blackberries, &c., has long since been prepared with sugar, and, after a short fermenting process, is used in families under the name of gooseberry *wine*, elderberry *wine*, &c. Such *wines*, however, are much too sweet for every day use, and with the rapidly advancing price of sugars, they will dwindle down more and more to the category of fancy drinks, to which they really belong.

According to a new method, recently patented through the Scientific American Patent Agency, by J. K. Baer, of Highland, Madison county, Ill., the juice of fruits or berries such as peaches, crabapples, cherries or blackberries, wild grapes, &c., is diluted from 5 to 8 times of its own quantity with water, and by a judicious admixture of a comparatively small quantity of sugar, and by a peculiar fermenting process, a light and good wine is produced, which can be sold at a very low price. The strength of the wine depends entirely upon the quantity of sugar that may be added, and when properly and carefully prepared, it is ready for use in from 10 to 15 weeks, though it gains more in flavor and taste when kept in the keg until the following spring. If put up in bottles with good tight corks, the wine will keep for five years and more, and it is then equal to grape wine.

IT is stated that an order will probably be issued immediately, reducing the term of service of the 300,000 new troops from three years to one year.

© 1862 SCIENTIFIC AMERICAN, INC.

RECENT FOREIGN INVENTIONS.

Gas Illumination.—A patent has been taken out by W. J. Williams, of London, for increasing the illuminating power of gas, which consists in causing the gas in its passage from the meter to the burners to pass through a series of rows of perpendicular cords, saturated with hydrocarbon liquid, such as naphtha, by which it becomes charged with hydrocarbon vapor; and, as the gas is liable to become overcharged with the vapor, often becoming very troublesome by condensing and filling up the pipes, and flowing out at the burners when opened, the gas is caused to pass through a condenser, where the excess of hydrocarbon vapor is condensed, and the liquid flows back to the evaporating chamber, from which it can be returned to the evaporator, while the gas in a properly-charged state passes on to the burners.

Gas Purifier.—An invention called a gas purifier and regulator, has been patented by William Clark, of London, and consists in filtering the gas before being consumed in the burner. It is simply a mass or plug of felt or wadding of wool placed in a chamber made in the base of the burner, through which the gas passes and is thereby purified, and burns under a constant and steady pressure.

Stone Ware Sleepers for Railways.—A patent has been taken out by P. Quantin, of Bordeaux, France, for the use of molded earthen ware and stone ware sleepers, as substitutes for those of cast iron and wood on railways. He molds the earthen ware sleepers hollow or solid, and of such a form as will suit the various descriptions of rails which may be used. They are in the form of blocks, one at each side to support the rails and a rod of iron unites them. The rail is not laid direct upon the stone ware blocks or sleepers, but upon several thicknesses of felt intervening. Durable sleepers are thus obtained, and the felt cushions under the rails prevent the sleepers from being broken by the hammering of the car wheels

Lucifer Matches and Paper.—A patent has been taken out by H. Mearing, of Camden, England, for making matches, as follows:—Wooden splints are first dipped in sulphur, and, after being dried, in the following composition: Powdered potash ten parts, oxide of antimony four parts, smalts five parts and gum two parts These are formed into a paste with water, and after the matches are dipped in it they are dried. Such matches will not ignite of themselves by friction, until they are rubbed upon paper, prepared as follows:—A paste is first made of flour and glue, and to every two parts of this paste, by weight, are added amorphous phosphorus six parts, graphite powder one part and silicate of soda one part. They are all intimately mixed together and spread upon the sheet of paper, which is then allowed to dry and is fit for use. Such lucifers are called safety matches, but they are not so convenient as the matches which will ignite by rubbing upon any frictional surface.

Couting for Iron Ships.—A new composition, to be applied like paint to the hulls of iron ships, to prevent them from becoming foul and rusting, has been patented by G. Ralston, London. It consists of black lead reduced to powder and then mixed with hot linseed oil in a close vessel, where it is stirred and then allowed to cool. Raw linseed oil, in the proportion of three pounds to each pound of black lead, is now added, and the whole stirred until a proper mixture is effected, after which hot beeswax, in the proportion of one pound to ten of the black lead is added, and the whole thoroughly incorporated together and set aside for use. When it is to be applied, it is reduced to the proper consistency to be laid on with a brush, by adding pure linseed oil. We believe this will make a most excellent paint for iron exposed to salt water.

THE British Parliament has appropriated £116,695 (about $583,000) for scientific and art institutions for the present year. There are 88 schools of art and science, in which are 91,741 students, for which £45,700 are applied. The South Kensington Museum receives £33.590. The Geological Society, £11,000. The British Museum receives a specific donation not included in the above.

THE French iron-clad frigate *Normandie* has been despatched to Mexico with troops.

Correspondence

Remains of an Elephant Found in Pennsylvania.

MESSRS. EDITORS:—Yesterday some workmen on the Atlantic and G. W. Railroad, while excavating in the valley of French Creek, Crawford county, Pa., came upon the tusk of a mammoth, or as it is sometimes improperly called, a "Siberian Elephant." The tusk was much injured before it was discovered that it was not a log of wood, as was at first supposed. It measured ten feet in length, and nine inches in diameter; some of the fragments were so well preserved, that on removing the outer coat, pure white ivory was seen.

On further examination, nine of the vertebræ and a number of the ribs were found in a remarkable state of preservation; also the shoulder blade, the tibia, and part of the ulna; the whole of the sternum was found measuring twenty-four inches in length, also a part of the skull. The next day I visited the spot, and secured the bones, which are now in my collection. A most perfectly preserved tooth was also found, and I herewith send you a drawing of the same, full size; its weight was five pounds.

The remains were found in a deposit of blue clay, in a valley, where, I am informed by old settlers, there were once extensive deer licks. Thinking it might be a matter of interest to the scientific world, to assist in determining the extent of the range of this wonderful animal, whose remains have been found so extensively in the north of Europe and America, I send you this imperfect account of the remains found here. Yours, &c.

A. B. RICHMOND.

Meadville, Pa. July 4.

A Ball Resting on a Jet of Water.

MESSRS. EDITORS:—You have doubtless seen a ball sustained on a jet of water. It does not lie immediately over the jet, always, but mostly hangs on one side; nor is it necessary the jet should be exactly perpendicular. How do you account for it?

J. P. Z.

[The ball is driven upward by the *vis viva* of the moving water, and it is prevented from falling off, in all the cases that we have seen, by forming the jet in a cup shape.—EDS.]

The Steam Wagon for Western Prairies.

MESSRS. EDITORS:—In the SCIENTIFC AMERICAN of June 21st, 1862, appeared an article headed "New Enterprise—Steam Wagon for the Western Prairies," in which the information is given that a great steam wagon had just been shipped from New York for the West, intended to convey freight from Omaha to Denver City, &c., &c. I have been over the ground frequently between Omaha and Denver City, and from the nature of the country and the streams, no steam wagon of the weight of this one could ever make the trip. From Omaha to the Elkhorn river, a distances of 30 miles, the road is a passable one, but from that point to New Fort Kearney, a distance of over 200 miles, the road is confined to a low bottom, usually overflowed in the spring season, and wagons drawn by two mules or horses, with one thousand pounds of freight, travel the road with the greatest difficulty, and many start and are compelled to leave their wagons sticking fast in the mud. But even if the road was a good one there are a number of difficult streams to cross; among them the Loup Fork of Platte river, a stream 200 yards wide with a quicksand bottom; and the main Platte river is also obliged to be crossed at New Fort Kearney, which is also a quicksand bottom, and near a half mile wide, without water sufficient to run a ferry boat, and many teams are drowned in the attempt to cross.

It strikes me that a steam wagon of twelve or fifteen tuns weight would have a good time traveling this route. I think, however, that such an enterprise might be successful if started from a point on the Missouri river some 30 miles South of the Big Platte; for from that point there is an excellent ridge road leading all the way to Fort Kearney, and no streams of any size to cross. I have no interest in any towns on the Missouri river, and give these opinions unbiased. J. W. GILCHRIST.

Fairfield, Iowa, June 26, 1862.

Currants, Trees and Small Birds.

MESSRS. EDITORS:—As currants are now becoming ripe I would advise all those who cultivate this fruit to allow them to hang upon the bushes until they are perfectly ripe. I give this advice because I am aware that this fruit is too commonly pulled before it has attained to maturity and has become sweet and pleasant to the taste. Currants and gooseberries make most excellent wine, but not as they are usually pulled, namely, when quite sour.

If peach trees were cultivated like currant bushes by allowing them to spread out around the roots, they would perhaps be more healthy and yield more regularly. I have found that leeched ashes when placed around the root of a valuable fruit tree that has become in a measure decayed, renovates it. The soil should be removed for a space of about 20 feet in circumference around the tree, the leeched ashes laid down therein to a depth of four inches and the soil then spread over this.

Of recent years worms and caterpillars have become more numerous and therefore more destructive all over the thickly settled parts of the country. They injure our fruit-bearing shrubs and trees in a most serious manner, and this evil appears to increase in magnitude every year. It is my opinion that this is in a great measure due to the very general destruction of small birds by men and boys who procced from cities on holidays and shoot harmless birds to obtain what they call *sport*. Most of these birds feed on insects and their larvae and they are therefore the friends man of keeping down insectoria. The destruction of the little birds should be prohibited by law. I recommend every man who has a garden, to put up bird houses and cultivate the society of wrens, blue birds, &c. These "warblers of the grove," feed upon moths that prey upon bee hives, and they are also enemies to the grape-vine caterpillar and many like pests of vegetation. D.

The Value of a Little Thought.

The other day we took out a patent for one of our numerous patrons for a simple little improvement in kerosene lamp tops. Scarcely had the document been issued, before the applicant had sold one half of his right to a prominent and highly responsible manufacturing company in this city, for the sum of six thousand dollars, with a royalty or tariff, in addition, upon each of the articles when manufactured. We are enabled to certify to the correctness of these facts, because we acted as agents for the receipt and payment to the inventor of the purchase money.

We mention the circumstance of this patent sale, for the sake of encouragement to those of our readers who have an inventive turn of mind. All is not gold that glitters; and not every invention can be applied to profitable account. But, as a general rule, he who is able to invent a thing for which the people have a lively want, is not likely to go unrewarded. Usually, the simpler the invention and the more general use to which it is adapted, the greater is the profit likely to be realized.

New Copper Stamping Mills.

The *Mining Gazette* (Houghton, Lake Superior,) states that Wm. Bull has made an important improvement in stamping machinery at the Copper Falls Mill. The improvement consists in expediting the flow of stamped sand from the mortar, as soon as it is sufficently pulverized for washing, thereby increasing the working capacity of the stampers, to about one-third more than at present. This is accomplished by a different and peculiar construction of the mortar, increasing its area, without increasing its bulk, and permitting the rock to be fed in on two sides, instead of one, as in those now in use, insuring a more regular supply. It is stated that one set of such stampers will crush as much rock in one day as two sets of the old stampers.

THE Steamship *Great Eastern* is now lying off Flushing Bay, about nine miles from New York, in Long Island Sound. She passed Greenport on the 11th inst., and entered the Sound, being the first British steamer which has come to New York by this route.

© 1862 SCIENTIFIC AMERICAN, INC.

Wind the Vital Current of the World.

[From Chambers's Journal.]

All true power is simple in its grandeur, and grand in its simplicity; this is especially the case with Nature in all her workings; she moves not with sudden start, but with calm progression. Even when she seems most perturbed, her agitation is but the disguise of her order.

There is none of the forces that rule the material world which appears so arbitrary and uncertain as the wind that bloweth where it listeth; yet is there none more clearly subject to fixed laws, or more beautifully dependent upon settled causes. Whether it be the tornado uprooting the forest, the zephyr just stirring the leaves, the simoom of the desert, or the monsoon of the ocean, all wind is the result of agencies directly traceable to their sources. It does not disturb the harmony of creation—it preserves it.

There are two properties of air which combine in producing wind—its capability of expansion by heat, and its elasticity. Air is not heated at the top by the rays of the sun; they pass through it with very little effect. But when they meet and are stopped by the earth, they heat the earth so much that the air immediately over its surface becomes much hotter than that above. Now, because hot air must expand, the heated portion rises to the top, overflowing the colder air around it; but this creates a diminished density below, and the surrounding cold air, by its own elasticity, rushes in to supply the deficiency. Thus is caused wind: an inward rush of cold air below, an outward rush of warm air above.

This may be illustrated and proved by the following simple experiment. Light a fire in one of two rooms having a door of communication between them. When the room has become warm, open the door, and hold a lighted candle in the doorway. It will be found that, on holding the candle near the floor, the flame will be strongly drawn toward the heated room by the incoming current of cold air, while near the ceiling it will be driven toward the cold room by the outgoing current of hot air. In the middle, at the point exactly between the two currents, the flame will be almost stationary.

The power of the sun to heat the earth is, of course, greater in places under its vertical than under its oblique rays. At the equator, therefore, the air is always rising from its heat; consequently, the cold air of the poles is continually rushing each way toward the equator, along the surface of the earth, while at the top of the atmosphere the hot air of the equator is constantly rushing toward the poles.

The question naturally arises here—How comes it to pass, then, that the winds in our country and the temperate zones generally, blow often from the equator toward the poles? The reason is simple. The overflowing current of hot air from the equator becomes cooled in traveling through space; by the time it reaches the thirtieth parallel of latitude in either hemisphere, or thereabouts, it is colder than the current rolling in the opposite direction below, the tendency of which is, of course, to get warmer in its progress; accordingly, the currents change places, and that which was the upper becomes the under, with a contrary movement. About the polar circle, their relative position is again changed by like causes, and the air which was uppermost at the equator resumes its place above. Warm air from all points converges and descends upon the poles, the cold air of which sinks and spreads in every direction, giving rise to the polar gales common in high latitudes; so that at the poles there is a constantly descending current of hot air, while at the equator there is a constantly ascending stream.

So far as we have gone at present, we have accounted only for winds to and from the equator and poles—that is, for north and south winds. What, then, occasions easterly and westerly winds?

These arise from the influence of a totally different force—namely, the earth's rotation on its axis. The earth is constantly rolling round from west to east with great velocity. As the earth is spherical, this velocity gradually decreases from the equator, where the speed is greatest, to the poles, at which it is nothing. Now, when the cold air is driven toward the equator in the manner before explained, it receives no increase of momentum eastward, and, therefore, the nearer it gets to the equator, the more it is left behind in the west by the quicker advance eastward of the earth's surface there; hence its current becomes a north-east or south-east wind. The westerly winds are the converse of this. The hot air rolling from the equator toward the poles with a strong easterly direction, gets far in advance of the more slowly-moving earth there, and blows more and more from the west.

Such is an outline of the general laws which rule the course of the wind. By their operation, a constant and wonderful circulation of currents is kept up in the atmosphere, purifying and regulating its temperature. Just as in the human body the life blood travels through every part, giving vitality and strength to the whole, so the air, which may be truly called the vital current of the world, is in constant motion. It visits every clime, to bless mankind with health and energy, to roll the clouds of heaven, bringing the showers that raise the blossoms of spring and the fruits of autumn, and to waft from shore to shore ships laden with the riches of the earth.

These general laws are nevertheless subject to many modifying influences, such as screening clouds and the difference of seasons, which decrease the heating power of the sun on the earth, and vary the relative warmth of the currents in different places. The unequal and irregular distribution of land and water also exerts a disturbing influence; for the surface of the earth becomes much more rapidly heated than that of the sea and cools much more quickly. Thus the presence of large continents or oceans affects the direction of the wind.

To this last influence is due the refreshing sea breeze, so ardently longed for by those condemned to remain in London during the dog days. On a hot day, the air over the sea is much cooler than that on land, and so there blows a delicious breeze from sea to shore; but, as land cools more quickly than water, after sunset the land breeze blows, from shore to sea. This may be easily understood and illustrated by placing a saucer of warm water, to represent land, in a dish of cold, to represent sea. The flame or smoke of a candle will be blown from every side toward the saucer by a mimic sea breeze. If you fill the dish with warm, and the saucer with cold water, an exactly opposite effect will be produced, corresponding to the land breeze.

The great subject of wind has been but just glanced at here; a volume might be written upon what is known concerning it, and much remains to be discovered as to the causes of whirlwinds, hurricanes, and storms of all kinds, as well as of local winds, confined to certain countries or parallels of latitude. Many interesting fields of inquiry lie open to the student, and many ardent votaries of science are eagerly exploring them; but from every fresh discovery we learn again the old lesson with which we set out, that Nature, even in her wildest mood, works in harmony. It was this lesson which the poetic imagination of the old Greeks taught by their legends of the music of the spheres; and every investigation from their days to ours has confirmed it to the seekers after wisdom.

Closing Fruit Jars.

The *Homestead* gives the following advice respecting jars for preserved fruit, and the manner of closing them when filled. It says:—

For the preservation of all kinds of fruits, use glass bottles or jars. Select those of even thickness, or rather of even thinness, for they are often exposed to considerable heat, and while they should not be so thin as to break in common handling, or burst from internal pressure caused by fermentation, still they should not be thick, or of pressed glass, when blown-glass jars can be readily obtained. So much for the bottles. Now as to closing them air tight, we know corks will not do it. The very structure of the substance is against it, unless cork of the most velvety character is obtained, and this is costly. We recommend waxed cloth tied over the jar as a substitute at once cheap and effective, and have never found anything superior to it. Prepare the cloth in this way: Melt together some rosin, beeswax and tallow in equal parts; tear the cloth in strips four inches wide, or at least wide enough conveniently to tie over the mouth of the jar, and dip these strips, drawing them through the hot wax and stripping nearly all the wax off. With cloth thus prepared, after the jar is filled with hot preserves, and while still hot, close the mouth and bind it on with good linen cord. Then with shears trim off as much of the waxed cloth as is desirable, and then dip it in some melted wax, which should be made with only about half as much tallow. Sealing wax may be used instead if desired. The jars should be put where the wax will cool at once, so that the exhaustion caused by the cooling of the preserves and the condensation of the steam, may not cause the wax to run through the cloth. Nothing can be more thoroughly air tight than bottles so prepared.

Self-sealing air-tight glass jars, which are now so common, are the best vessels known to us for securing preserved fruits, but the above is good advice to those who have plenty of common-glass jars and bottles.

A Discovery Near Corinth, Miss.

A correspondent residing at St. Mary's, Ohio, writes us as follows:—"Inclosed I send you a drawing of a model for *something* which a friend of mine, a Lieutenant in the 5th Ohio Battery found in a 'secesh' house in Corinth, after the skedadling of the rebels." He concluded, that as he had been a target for "secesh" bullets for two days at the battle of Shiloh, to appropriate the thing and get your advice respecting its patentability, and whether under the circumstances he could not claim it.

The invention referred to by our correspondent is an old fashioned horse power, far inferior to those in common use in this section.

The Lieutenant of the 5th Ohio is entitled to something more valuable than an old "secesh" horse power for his valuable services at the battle of Shiloh. Some antiquary might purchase it as a relic of the war; but under our law, even if it was a valuable improvement, no one but its inventor could apply for the patent.

A Man Stopping His Heart by His Own Will.

From an article on the Heart, by Isaac Ashe, B.A., T.C.D., L. M., in *The Popular Science Review*, we take the following extract:—

This four-chambered heart is a muscle, and acts by means of muscular force. What the agent may be which irritates this muscle and so causes it to contract, has been a subject of much discussion; but it is now generally considered that this agent is oxygen, which is received into the blood in the lungs, and stimulates the muscular contractility of the heart through the nerves of the organ. This muscular action of the heart is almost entirely beyond the control of the will, as indeed are all the vital actions of the body; yet instances have been related of persons who were able to stop the heart's action at will, and in one case this experiment was carried too far, and the individual died by the mere act of his own will. On the other hand, the heart will continue its regular pulsations for a long time after its removal from the body, and of course the death of the animal; and the lower the creature in the scale of creation, the longer will this action continue; so that the heart of a sturgeon will continue to beat as long as twenty-four hours after its removal from the creature.

White Millers.

At the present time many of the trees in our cities appear as if they were covered with snow flakes. Myriads of white millers are seen flying about them in the evening, busy with depositing their eggs. Each miller lays about one hundred eggs in a small patch. They are of an oval shape, each is about the size of a small pin head, and is cemented with transparent varnish to the trunk of the tree. These beautiful white insects die almost as soon as they deposit their eggs, which in due time become offensive caterpillars, then crysalides, then millers; and thus they are produced from year to year.

BEE PASTURAGE.—The *Bee Journal* says:—"The rapidity with which bees will build comb and gather honey, under favorable circumstances, is so extraordinary as to be almost incredible. Mr. Brink says that he has known a strong swarm to fill its hive with comb in seventy-two hours; and that colonies expelled in August, put into empty hives, and transported to the heaths, would fill the hive with new comb and gather from thirty to forty pounds of honey, in the brief season for work in which they could labor."

© 1862 SCIENTIFIC AMERICAN, INC.

Improved Gang Plow.

We seem to be approaching the time when farmers will give up working with their hands, and will cultivate all of their crops by riding about their fields. They ride in sowing, reaping, mowing and raking, and now it appears they are to ride in plowing. Is there not danger that they will be growing lazy?

The accompanying engraving represents a gang and ditch plow invented by J. F. and W. L. Black of Lancaster, Ill., who say that it has been tried for two years, and proves to be exceedingly convenient and effective.

The plows are secured rigidly to the frame and the frame to the axle in the manner shown; the principal novelty being in the device for raising the plows out of the ground at the end of the furrow. For this purpose the draft pole is secured between the front ends of the plow beams by a bolt so that it may turn up or down, and a brace, *a*, with a toggle joint in the middle is interposed between the pole forward of the bolt and the foot board of the driver's seat. A rod, *b*, connects this brace with the lower end of the lever, *c*, and when the plows are in operation this lever is held in place by a catch, *d*, on the side of the seat.—When the end of the furrow is reached, the driver releases the lever from the catch, and throws its upper end forward, thus bending the brace, *a*, at its joint and drawing the foot board nearer to the draft pole. This tips the rear end of the frame up, and lifts the plows out of the furrow. The driver may aid the movement by throwing his weight forward in the seat.

For ditch plowing, two plows are arranged on one beam, as shown at E, and this beam is substituted for one of the beams in the frame.

This trench plow is used in breaking up prairie; the first plow cutting a thin slice and turning it into the adjoining furrow, and the following plow completely covering the sod with pulverized earth, forming a fine tilth. Stubble may be plowed under with these gangs in a very effectual manner; covering it entirely out of the way.

In gang plowing the width of the furrow is regulated by the screw, *f*, on the side of the pole, and the depth by the plates, *g*, at the ends of the axle.

The patent for this invention was granted through the Scientific American Patent Agency, July 30, 1861, and further information in relation to it may be obtained by addressing the inventors, J. F. and W. L. Black, at Lancaster, Ill.

BLACK'S GANG PLOW.

Improved Self-Cleaning Harrow.

The principal fatigue in harrowing is caused by the labor in lifting the harrow to clear it from the sods and other obstructions which it collects in passing over the field; the invention here illustrated is designed to obviate the necessity of lifting the harrow at all in order to free it from obstructions.

The teeth are secured in cross beams, which are so connected that they may all be readily turned upon their axes in a way to incline the teeth backward at an acute angle, and thus allow the harrow to rise and pass over any sods which it may have collected.

The engraving represents the harrow with the teeth the vertical position for working. The beams, *a a a a*, in which the teeth are secured, are connected together at both the upper and lower sides by metallic links, *b b*, having hinged joints at their ends. The links on the upper sides of the beams are raised by intervening blocks, as shown. A forked lever, *c*, is connected at its forward end by hinged joints to the lower side of the front cross beam, while a loop near its rear end embraces the upright bar, *d*, which is hinged at its lower end to the lower back corner of the rear cross beam.

Upon each side of the lever, *c*, is hinged a brace, *e*, the rear ends of these braces being hinged to the upper sides of the blocks of the cross beam.

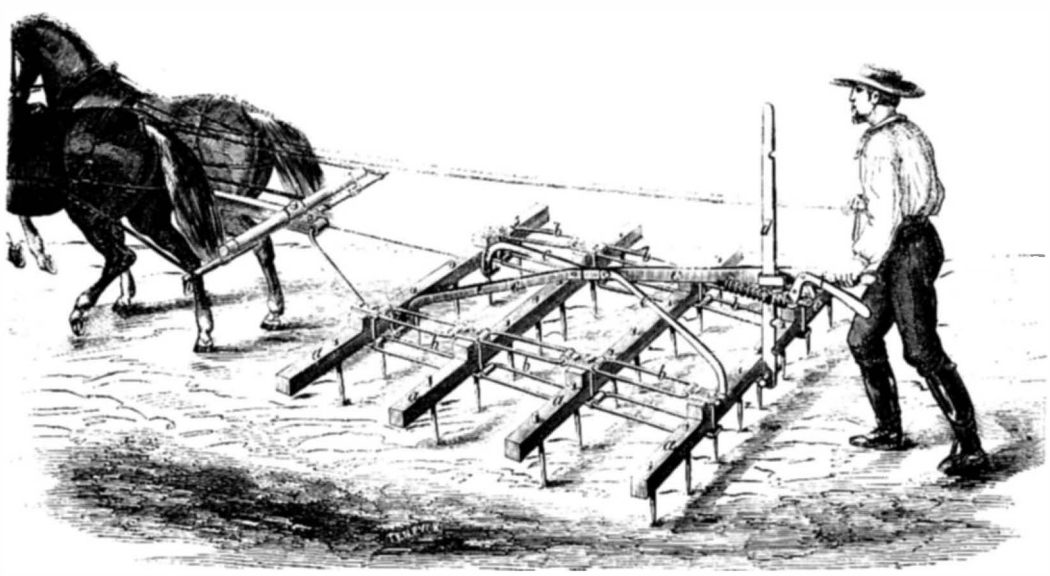
It will be seen that when the rear end of the lever, *c*, is raised, the cross beams are all turned upon their axes, inclining the teeth backward at their lower ends. Notches are made in the back edge of the bar, *d*, and a movable latch, *f*, is mounted on the side of the lever, *c*, so as to fit into any of the notches on the bar *d*, by which means the end of this lever is held at any desirable elevation; and the teeth are thus turned at a greater or less angle at the will of the operator. One arm of the latch lever, *b*, is brought back by the side of the lever, *c*, so that as the workman grasps this lever to raise it, the latch is drawn from its hold upon the upright lever, *d*. The operator, when he finds the harrow has gathered any considerable amount of sods or other obstructions, has merely to grasp and raise the end of the lever, *c*, by which movement the teeth are turned backward and the implement slides over the obstruction. He then moves the end of the lever, *c*, down to its proper notch on *d*, thus bringing the teeth back to a vertical position, ready to continue their work, and allows the latch, *f*, to again hold it firmly.

One notch is made at the upper end of the rod, *d*, for holding the teeth nearly in a horizontal position when it is desired to drag the harrow to or from the field.

Besides the great facility for clearing the harrow secured by this arrangement, the connection of the beams by means of hinged links, causes the implement to conform to the inequalities of the ground. If it is desired to make it more pliable still, the beams may have hinged joints in the middle, which will allow it to yield in every direction.

It is frequently desirable in harrowing different kinds of soil, to set the teeth inclined more or less forward or backward, in order to get a proper hold, and to induce proper action on the earth. The several notches in the bar, *d*, may be as near together as necessary in order to allow the adjusting of the position for this purpose with great nicety.

This harrow is an invention of George Cook, to whom and his joint assignee, William Scarlett, a patent was granted June 10, 1862. Further information in relation to it may be obtained by addressing William Scarlett, at Aurora, Illinois.



COOK'S SELF-CLEANING HARROW.

Mr. Wilkinson's Letter.

In another portion of this paper, we publish a long letter from David Wilkinson, containing reminiscences of the early efforts to establish manufactures of various kinds in this country. The Wilkinsons were at one time the leading mechanicians and manufacturers in New England, and were regarded as authority on all questions relating to mechanics. The descendants are numerous, and are generally considered the inheritors of superior intellects. We have repeatedly heard the story of David Wilkinson and his brother building a water wheel larger than their fall required, in order to get the "leverage" of the long spokes. It is a striking evidence of the general advance in knowledge of mechanical principles, that no millwright of the present generation would fall into this blunder, which was committed by the very ablest mechanics of only the last generation.

In the final report of Joseph Holt and Robert Dale Owen, Commissioners on Ordnance Contracts, they state that they have effected a saving on contracts made prior to Secretary Stanton's taking office, of $17,000,000.

© 1862 SCIENTIFIC AMERICAN, INC.

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum—One Dollar in advance, and the remainder in six months

Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.

Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No travelingagents employed.

VOL. VII. NO. 4.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, JULY 26, 1862.

IRON-CLAD FRIGATES—BENDING THEIR ARMOR PLATES.

The steam frigate *Roanoke*, which is now in the Navy Yard, at Brooklyn, has been razeed, and is being converted into an armor-clad turret war ship. She is to be clothed amidships with thick iron plates, which are to extend about five feet below the water-line; and she will have three great revolving gun turrets on deck, and a powerful iron beak or ram on her bow. This beak resembles a huge ax, and is formed of plates twenty feet long, four and a half inches thick, thus making nine inches of iron on the front edge. Each of the revolving gun turrets will be twenty feet inside diameter, and the sides will be formed of eleven courses of inch-iron plates. These plates are laid over and riveted to one another in such a manner as to "break joints," and vertical plates are also bolted to several courses so as to secure the whole in the most rigid and perfect manner. These gun towers, for the *Roanoke*, are now being constructed at the Novelty Works, in this city, where the plates for them, likewise those for the armor, are bent to the proper curves. Each plate for a turret is about nine feet in length by forty inches in width, and an inch in thickness. Two courses of rivet holes are punched out in each, and they are all bent cold in a powerful hydraulic press. The bed plate of the press is of a concave form, and the top block is of a convex form. A plate to be bent is placed upon the concave bed plate of the press, and when properly adjusted the pump forces up three rams under it, and the plate is reduced to the proper curve against the top block. The pressure to which each plate is submitted, to give it the proper curve, is three and a half million pounds. By this method of bending the turret plates cold, there is perfect uniformity and accuracy secured for the whole. The turrets for the *Roanoke* will be of a superior character, but only six courses of plates have as yet been laid on two of them.

The bending of the thick plates for the ram, and also for the sides of the frigate, is quite a different and difficult operation to perform, compared with those of the gun towers. Each of these plates has to be bent to the proper curve to suit its own particular place on the vessel, and not only the broad side but the edges also must be bent to suit the particular curves. The bending operations are under the charge of Mr. George Bonniwell, an intelligent young shipwright. All these plates are of hammered iron, and are furnished by several companies, in Pennsylvania, New York and Massachusetts. When they arrive, they resemble huge straight iron slabs, varying in length from eleven to twenty-two feet, and in breadth, from twenty-two to twenty-four inches, and their average thickness is four and a half inches. One of eleven and a half feet length weighs about 4,240 lbs; one of twenty-two feet length, for the ram, weighs over four tuns. Such masses of iron are difficult to move about, and the operations connected with bending them are necessarily tedious and troublesome; and they require great care and skill to conduct properly. Of course, it is impossible to bend such masses of iron cold, hence each plate is first heated to nearly a white heat in a long furnace, shaped somewhat like a baker's oven, with a movable arched cover. The press for bending is quite different from the one used for the turret plates. Outwardly it resembles a long, strong iron screw press, used for pressing woolen cloth. Its top block, or platen, is moved up and down, but its bed is fixed and very solid. A Dudgeon hydraulic jack at each end supports, and moves the top block up and down. The bed, upon which the heated plate is laid, is formed of a series of adjustable boltster blocks, each of which is capable of being set by a screw to any desired hight on either side, and at any desired angle to suit the bend to be given to a plate which is compressed between the descending top-block and the adjustable bed. A plate is first placed in the furnace, and it is then raised to nearly a white heat. The cover of the furnace is now raised by a block and tackle, and the plate is then seized by a powerful crane, secured on a carriage. The heated plate is now lifted, the crane carriage moved back, and the plate swung around and placed in the press, where it is perfectly adjusted to obtain the proper curves. The huge top-block is then forced down, squeezing the great mass of iron into the desired shape. In about half an hour, the plate has acquired a permanent set, and it is taken out, ready to have its edges planed, when it is fit for bolting to the frigate. The bolt holes in these plates are all drilled. It requires a large number of men to move such great heavy masses of iron, and from the time a glowing plate is lifted out of the furnace until it is secured in the press, the scene is one of extrordinary activity and excitement, as the plate requires to be placed in the press as expeditiously as possible before it becomes cool. The metal of these plates appears to be first class; but until within a few days past they were furnished very slowly by the different contractors. The plating of the *Roanoke* will now proceed with greater rapidity; still she will not be finished for several months to come. We were told that this frigate is expected to obtain a speed of about ten knots per hour. If she makes nine knots we shall be agreeably disappointed. As the *Roanoke* will sit very low in the water, we hope that proper arrangements will be made for ventilation on the main deck. The defects of the *Galena* and *Monitor*, so clearly pointed out in the SCIENTIFIC AMERICAN of last week, by an intelligent correspondent, will be reproduced in the *Roanoke*, rendering her very deficient as a "sea-boat," unless this advice is heeded.

THE TRUE REMEDY FOR THE SCARCITY OF CHANGE.

As the Government is issuing more currency than there is a natural demand for in the community, its value necessarily declines. Gold is quoted at 15 per cent, premium, which simply means that our currency is at that discount. It is one of the inexorable laws of trade that currency will flow to a level in all of the countries in the world; no community can have for any considerable time more than its share, and none can have less. If $300,000,000 is the amount which naturally falls to the lot of the United States, from the present amount of our wealth and of our business transactions, and from the present supply of specie and paper money in the world, then it is impossible to increase the value of our currency much above 300,000,000. If we issue 600,000,000 of Government notes, making them a legal tender, they will fall to about 50 per cent.

The effect of a depreciated paper currency is always to drive out of the country all currency of greater value. This has been tried fully in Sweden, Russia, France and other countries, and the gold and silver always disappeared. In Sweden, so great was the drain of precious metals, that even copper in bars was exported. The effect is inevitable, because it results from universal principles of human nature.

The excessive issue of Treasury Notes is the greatest blunder which it was possible for the Treasury Department to commit, for a debasement of the currency deranges, not merely commerce and trade, but all of the industrial operations of the community. Every man at work for wages is now receiving some 15 per cent less than he contracted for, and all existing contracts are impaired to this extent. This may not be immediately apparent, but it will soon manifest itself in a general advance of nominal prices. Men working for a dollar a day will soon find that they can buy only 85 cents worth of merchandise for the piece of paper that is called a dollar; and if the issue of Treasury Notes continues, one of these same pieces of paper will bring only 50 cents worth of any commodity. It is true the grocer will still sell a dollar's worth of sugar for a paper dollar, but his dollar's worth will be 7 pounds instead of 14.

The true and best remedy for this evil is for the Government to return to a specie currency, laying tax enough to support its expenses. The tax, however severe, would be less burdensome than this paralysis of all operations by the destruction of the currency. But if they have not nerve enough to adopt this effectual remedy, the evil may be palliated to the extent of providing change to circulate with the depreciated paper, by simply issuing coin debased to the same extent as the paper. Let our silver coin remain at its present weight, but be made of an alloy 20 per cent cheaper, and it will not be shipped abroad in the settlement of foreign exchange.

COATING THE HULLS OF IRON SHIPS.

The necessity of providing an American navy iron-clad vessels, is felt and being acted upon by our naval authorities. There is one evil connected with iron ships which demands the attention of scientific and practical men, namely, their liability to become foul by barnacles adhering to the plates below the water line. Wooden vessels were once subjected to the same evil, but the discovery that copper and brass sheathing prevented the adherence of shell fish, ultimately afforded a complete remedy. Neither copper nor brass sheathing, however, can be applied directly to iron, because, when these metals are brought into contact with iron in water, a galvanic action results, and the positive metal—iron—is decomposed with great rapidity. The hulls of all iron steamers are painted, but the common paints used for this purpose do not afford sufficient protection, hence such vessels have to be frequently placed in dock and their bottoms scraped. But this frequent docking is not the only evil, for when the hull of a ship becomes foul its resistance in the water is greatly increased, and it becomes difficult to steer, while, at the same time, its speed is also diminished. The speed of an iron steamer in tropical waters, has been reduced by fouling from twelve to seven knots per hour, after running but one year. It is, therefore, apparent that the expense of running iron steamers is greatly increased on account of their bottoms becoming foul, and that a perfect preventive, of a simple character and not too expensive, is of much importance. In England, a great deal of serious attention has been devoted to this subject, but not so much in America, because all our vessels, hitherto, were constructed of wood. Now, however, as we are entering upon a career of iron shipbuilding, this subject demands thorough investigation, and a series of experiments should be undertaken, and continued until a complete remedy for the evil is discovered.

We learn by Mitchell's *Shipping Journal*, that Mr. R. Mallet, Civil Engineer, London, has made many experiments with iron in contact with other metals and substances, and the following interesting statements were made by him at a meeting of the United States Institution:—

"Iron in water not exposed to air, he had proved by experiments, never corroded. Iron in contact with platina does not corrode. The estimated rate of corrosion of average iron was $\frac{6}{10}$ths of an inch, spread over a century, from natural causes. Iron could be protected in the mass by zinc, in the proportion of 120 square feet of iron to 1 square foot of zinc. Dutch metal, which is an alloy of 4 atoms of copper to 1 of zinc, was very good, for a vessel so coated was relatively as 49½ to 84. Corrosion is also influenced by the quality of the metal. Common bolt plates corrode in a given time in a ratio of 36, whilst the best scrap was only 2½. He cited this as a proof that the quality of the metal had everything to do with the deterioration. As to protection from animalcules, he said, that oils or any fatty matter were a preventive, but unfortunately grease would not adhere long enough to be effective. He had kept shellfish in water to test the effect of metallic poisons. He discoved that by commencing with small doses of sulphate of copper, oysters would live on a fluid that would poison a man. He had run a penknife into an oyster thus dosed for a couple of years, and the blade came out coated with copper. He inferred therefrom

© 1862 SCIENTIFIC AMERICAN, INC.

that all metallic compositions were not proof against fouling.''

None of the British experimenters, so far as we have been able to learn, have made experiments with zinc white, the superior qualities of which, as compared with red lead paint, were described on page 74, Vol. VI. (new series) SCIENTIFIC AMERICAN. We thus allude to the zinc white, because we have noticed that red lead is still most generally used for coating the hulls of iron steamers, and it is a very indifferent protective. Arsenic, antimony, copper and other pigments, combined with oil as paints, have been tried and found insufficient, we believe, as affording an efficient protective for iron hulls.

THE LONDON EXHIBITION.

In America, where water power is so abundant, great attention has been devoted to hydraulic engines, such as water wheels, of different kinds, water rams, &c. In Europe much attention of late years has also been devoted to hydraulic engines, of which those now on exhibition in London afford substantial evidence. The following is a condensed description of several in the Exhibition, taken from the London *Engineer*:—

HYDRAULIC MACHINERY.

The turbine wheels in the Exhibition are mostly of the center-vent class. One called Schiele's turbine is made to operate like the Parker wheel, either on a vertical or horizontal shaft. The water is admitted to the wheel through a spiral case surrounding it, and through curved guide vanes which conduct the water inward, as in inward-flow turbines. The wheel itself, however, has two sets of buckets, opening in contrary directions, so that, in a turbine with an upright shaft, one half of the water is discharged upward and the other half downward. The lower set of buckets are like those of any Jonval wheel, and the upper set are different only in so far as that they are inverted. The only advantage claimed for this arrangement is that of relieving the footstep from the weight of the column of water. The guide vanes and buckets are all cast in with the wheel and casing, and are necessarily thicker than if they were made in plate iron. The makers of this wheel claim for it that it gives from 75 to 85 per cent of the theoretical power of the water, but this claim is founded upon questionable data. This wheel has also adjustable slides at the inner apertures of the guides, so as to regulate the admission of the water to the wheel.

Bryan, Donkin & Co. exhibit a turbine of 36-horse power. It makes 150 turns per minute, under a fall of 40 feet. The stationary guides do not occupy a whole circle above the wheel, but are divided into two groups, each occupying 90° of the circle. These guides are covered or opened by two segmental slides moved by suitable hand gear. Thus only one half at most of the buckets of the wheel can be filled with water at the same time, and thus a wheel of twice the diameter of an ordinary Jonval turbine is required to do a given work. The guides and buckets are of cast iron, thick, and almost of necessity wanting in that accuracy of form essential to the best results with a turbine. This is said to be a defective wheel, and it is not provided with a draft box, like American Jonvals.

Richard Roberts exhibits a small inverted Jonval turbine. The flow of water is upward, for the purpose of relieving the step of the shaft from downward pressure. Whitelaw & Stirrat's Scotch turbines are constructed in this manner; Schiele's wheel contains a like provision, but not an improvement, and many wheels in America are provided with arrangements to take the pressure off the step.

A French turbine is exhibited by M. M. Fontaine and Brault of Chartres, France. It is a Jonval turbine with some peculiarities. It has an inner set of guides and buckets for regulating the quantity of water to the wheel, according to the work which it has to perform. These regulating guides for European turbines are well known in America. Their design is to adapt the wheel for varying quantities of water on streams in which the supply is irregular. Their object is similar to a governer cut off on a steam engine. The London *Engineer* commendably requests that trials may be made with a friction brake to ascertain the real efficiency of these and other turbine wheels, so that the merits of each may be accurately determined.

CENTRIFUGAL PUMPS—ROSE WATER.

Messrs. Gwynne & Co.'s American centrifugal pump presents an imposing appearance. It is placed on a horizontal axis, and throws a column of water which flows through a lofty entablature in a cascade 21 feet high and 10 feet wide. The water is lifted from a tank and is scented with rose perfume. As it falls in sparkling showers, it sends off its oder and fills the whole atmosphere with its fragrance. This pump is 4 feet in diameter, and the suction and discharge pipes are 30 inches in diameter. The pump is driven direct by a pair of horizontal high-pressure engines, having 18-inch cylinders, 14-inch stroke, and intended to make 210 revolutions per minute.

One of Appold's large centrifugal pumps is also exhibited. The pump fan, as it revolves, draws in water at the center and discharges it at the periphery through several curved vanes, into the discharge pipe. It is placed on a vertical axis, and is 4 feet 5 inches in diameter, the inlets above and below being 27 inches in diameter. The working speed is 118 revolutions per minute, at which rate the periphery of the fan moves with a velocity of 27½ feet per second, equal to the theoretical velocity of water flowing out from a head of nearly 15 feet. It is driven by a pair of condensing engines of 20 inches cylinders and 2 feet stroke, working steam of 50 lbs. pressure, cut off at one-fourth stroke, and making 50 revolutions per minute. This speed is brought up to that of the pump by means of bevel gearing.

EXPERIMENTS WITH WORKING STEAM EXPANSIVELY AND WITH CONDENSERS.

We have received a copy of the General Report of the Trustees of the Cincinnati Water works for the past year, in the appendix of which is another report of great interest to all steam engineers. This report is made by Messrs. T. R. Scowden, Americus Warden & T. J. Haldeman, who were appointed as commissioners to make a series of experiments to test the surface condenser of Mr. Benjamin Crawford, which had been applied to the water-work engines, in order to ascertain whether it possessed any advantages in saving fuel over working the engines without the condensers.

The experiments were conducted by taking the weight of the fuel consumed and measurement of the water delivered at the reservoir, as well as the hight the water was lifted, to determine the duty performed by the engines. The first trial commenced on Nov. 20, 1861, and continued 8 hours and fifteen minutes.

The formula adopted by the committee for computing the duty is as follows:—

FORMULA.

$$\text{Duty} = \frac{\text{lbs. of water delivered at reservoir} \times \text{hight in feet.}}{\text{Pounds of coal burned.}} \times 100$$

TRIAL No. 1, November 20, 1861.

Engines without condensers attached. Steam cut off at three-eighths stroke. Boiler pressure ninety pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 13{,}207{,}926.43 \times 152.35.}{\text{5,739 lbs. of coal.}} \times 100 = 35{,}062{,}338.$$

lbs. raised 1 foot.

TRIAL No. 2, November 21.

Engines with surface condensers attached. Steam cut off at three-eighths stroke. Boiler pressure ninety pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 13{,}265{,}721.6 \times 153.43.}{5{,}739.} \times 100 = 35{,}465{,}230.$$

On the morning of January 10, 1862, the cylinders and side pipes being clothed, the heating tubes inserted in the rear of the furnace and the damper applied to the chimney, the committee met, pursuant to adjournment, at the pumping house and took charge of the combination engines, weighed the coal, found the difference of level between the river and discharge pipe at the reservoir, noted the register and the steamgage and proceeded with the trials as before. The following are the results:—

TRIAL No. 3, January 10, 1862.

Engines working with full attachment. Steam cut off at three-eighths stroke. Boiler pressure ninety pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 12{,}897{,}603.6 \times 157{,}02.}{\text{5,739 lbs. of coal.}} \times 100 = 35{,}288{,}057.$$

lbs. 1 foot high.

TRIAL No. 4, January 11, 1862.

Engines without condenser attached. Steam cut off at three-eighths stroke. Boiler pressure ninety pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 14{,}930{,}835.43 \times 155.77.}{5{,}739.} \times 100 = 40{,}525{,}809.$$

TRIAL No. 5, January 12, 1862.

Engines with condenser attached. Steam cut off at three-eighths stroke. Boiler pressure ninety pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 13{,}312{,}398 \times 154.50.}{5{,}739.} \times 100 = 35{,}838{,}395.$$

TRIAL No. 6, January 13, 1862.

Engines with condenser attached. Steam cut off at three-eighths stroke. Boiler pressure eighty pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 12{,}336{,}043.20 \times 151.77.}{5{,}739.} \times 100 \quad 32{,}623{,}127.$$

At this point in the proceedings a change was made to cut off steam at five-eighths stroke instead of three-eighths, as before, to ascertain the effect of working steam lower and less expansively.

TRIAL No. 7, January 28, 1862.

Engines with condensers attached. Steam cut off at five-eighths stroke. Boiler pressure forty pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 11{,}401{,}853.55 \times 133.73.}{5{,}739.} \times 100 = 26{,}568{,}563.$$

Finding by the result of this trial a greater falling off of duty by cutting off at five-eighths stroke and working at low pressure, it was concluded to cut off as before. Then commenced.

TRIAL No. 8, January 30, 1862.

Engines with condenser attached. Steam cut off at three-eighths stroke. Boiler pressure one hundred and fifteen pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 14{,}372{,}000 \times 144.94}{5{,}739.} \times 100 = 36{,}278{,}945.$$

At the conclusion of this trial the heating tubes were removed from the surface, retaining of the attachments made only the clothing of the cylinders and side pipes. The experiments were then resumed.

TRIAL No. 9, February 6, 1862.

Engines with condensers attached. Steam cut off at three-eighths stroke. Boiler pressure ninety pounds.

$$\text{Duty} = \frac{\text{Delivery. Litt.}\quad 13{,}891{,}281.60 \times 133.02.}{5{,}739.} \times 100 = 32{,}197{,}575.$$

TRIAL No. 10, February 7.

Engines with condensers attached. Steam cut off at three-eighths stroke. Boiler pressure one hundred and ten pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 15{,}560{,}564.40 \times 133.6.}{5{,}739.} \times 100 = 36{,}223{,}931.$$

TRIAL No. 11, February 8.

Engines without condensers attached. Steam cut off at three-eighths. Boiler pressure one hundred and ten pounds.

$$\text{Duty} = \frac{\text{Delivery. Lift.}\quad 17{,}362{,}767 \times 133.77.}{5{,}739.} \times 100 = 40{,}470{,}768.$$

This last trial with the combination engines, without any of Mr. Crawford's attachments, except the clothing on the cylinders and side pipes, gave the best result. It will be observed that several more trials were made with the condenser attached, than without, which was done to afford Mr. Crawford an opportunity to develop the full advantages of his condenser and other appliances, all parties express-

© 1862 SCIENTIFIC AMERICAN, INC.

ing themselves satisfied with the three trials of the engines without any attachment, except the clothing on the cylinders and side pipes.

It will be noticed that these experiments prove that there is a saving of fuel in using high-pressure steam and working expansively, as compared with using low-pressure steam in the same manner. Although no saving of fuel was experienced by the use of the surface condenser, the report says that the short interval allowed for their trials was not sufficient to determine the extent of economy in using surface condensers, by which clean water is obtained for the boilers, in place of dirty water from the river which is charged with carbonate of lime and forms incrustations.

A peculiar result, and one not accounted for in this report, has also been obtained in working these Cincinnati engines. It is this: the power required to lift the water is not proportioned to the varying hights of the water. The report says on this head, "It appears that in elevating water some 27 feet higher than at lower stages of the river than was done at these trials, the indicated power to overcome the additional head was increased only three per cent, while the difference of lift was some sixteen per cent greater." The hydraulic motors at Cincinnati are called "combination engines," but their peculiarities are not described. We wish they had been worked at full stroke during these trials, when the highest pressure was carried in order to ascertain whether any gain was obtained by expansion at the same pressure. The engineer, Mr. Shield, may at some future time favor the public with a record of such experiments.

INTERESTING REMINISCENCES.

David Wilkinson's Account of the first Cut Nails ever made—The Beginning of the Cotton Manufacture in this Country—The first Leather Belts—Proposal for a Steamboat in 1791*—Machinery for the First Canal, and many other Curious Matters.*

The following letter was contributed by the Rev. Dr. Taft, of Pawtucket, R. I., to a committee of the Rhode Island Society, for the Encouragement of Domestic Industry, who were appointed to collect information in relation to the introduction of the power loom into this country. We doubt not that it will be read with great interest:—

Autumn, 1846.

In April, 1776, Eleazer Smith, who had been at work for Jeremiah Wilkinson, Jr., a Quaker of Cumberland, came to my father's blacksmith shop, which was making scythes, in the town of Cumberland, Rhode Island, to make a machine to manufacture card teeth, for Daniel Anthony, of Providence, who was going into the card-making business. While at work, Smith told my father of Jeremiah Wilkinson's making card tacks of cold iron. In laying the strip of leather around the hand card, he lacked four large tacks to hold the corners in place, while driving the tacks around the outer edge. He took a plate of an old door lock off the floor, cut four points with shears, and made heads in the vice; but afterward made a steel bow with scores in it, and put it in the vice, and in that way made tacks.

I think in 1777, my father made a small pinch press, with different-sized impressions, placed on an oak log, with a stirrup for the foot, and sat me astraddle on the log, to heading nails, which were cut with common shears. He cuts the points off the plates drawn by trip hammer. This was the commencement, in the world, of making nails from cold iron.

I think about 1820, I went to Cumberland, with Samuel Greene, my nephew, and purchased of Jeremiah Wilkinson, the old shears, with which he cut the first four nails. He was, I think, ninety years of age at that time. The shears were a pair of tailor's shears, with bows straightened out, and the blades cut off half the length. They were deposited with the Historical Society, in Providence, by Samuel Greene.

My father, Oziel Wilkinson, lived in the town of Smithfield, Rhode Island, in 1775, at the commencement of the war, and owned a blacksmith shop, with a hammer worked by water. It was here Eleazer Smith made the machine for Daniel Anthony. I was then about five years old, and my curiosity was so great to see the work going on, that my father sat me on Mr. Smith's bench, to look on while he worked. At this time, seventy years afterward, I could make a likeness of nearly every piece of that machine—so durable are the first impressions on the mind of youth. After Smith had finished the machine, so as to make a perfect card tooth, he told the people in the shop that he could make a machine to make the tooth, prick the leather, and set the tooth, at one operation.

Jeremiah Wilkinson carried on the business of making hand cards for carding sheep's wool, and it being difficult to import wire, he drew the wire out by horse power.

In 1784 or '5, my father put the anchor shop in operation, at Pawtucket Falls on the Blackstone river, in North Providence, Rhode Island.

About this time, I heard of cotton yarn being made in or near East Greenwich, in which John Reynolds and James Macarris, who employed a Mr. Mackwire, or Maguire, to make yarn on a jenny, for which I forged and ground spindles. I made a small machine to grind with, which had a roller of wood to roll on the stone, which turned the spindle against the stone, and so ground the steel spindles perfectly. I heard of no other machines for carding cotton.

About this time also, a number of gentlemen in the town of Providence, commenced some machinery for working cotton. Andrew Dexter, merchant, the father of S. Newton Dexter, of Oriskany, Oneida county, N. Y; Aaron Mann, father of Samuel F. Mann, of Providence; Lewis Peck, merchant; Daniel Anthony, and I think Moses Brown, of Providence, were aiding in the work. My father was applied to, to make iron work for a machine for carding cotton, which was done by the help of a carpenter, named Joshua Lindley, and a brass founder, named Daniel Jackson, father of Samuel and John Jackson, of Providence. The card circles, or rims, were made of wrought iron, as there was no furnace near. The card was put in operation in the Market House chamber, in Providence, and was turned by a colored man, named Prince Hopkins, who had lost one leg, and I think one arm, in Sullivan's expedition at Newport, a few years before. The cotton was taken from the card in rolls about eighteen inches long, and carried one mile from town to Moses Brown's, where it was made into roping, by a young woman in Mr. Brown's employ, named Amey Lawrence.

About this time, too, Daniel Anthony made a trip to Bridgewater, and returning said he had some parts of a machine, called the Arkwright Water Frame, which was commenced by a European, in the employ of Colonel Orr, of Bridgewater, and given up, or the few parts thrown by. He soon had one under way in Providence, which was made and finished in Pawtucket, and put in operation there, by Anthony's two sons, Joseph and Richard, assisted occasionally, by two other sons, Daniel and William. The rollers were made of half-inch wrought iron, with swells of brass cast on, and fluted with files. The bobbin which received the yarn from the spindle was made with a score in the bottom, to receive a cross cat-gut twine, with a tightening wooden thumb screw, like a violin, to regulate the taking up—which Mr. Slater performed in his first water frames, by making a wide flat bottom to the bobbin, set on a wooden cloth washer, to regulate the taking up, as the friction would increase by weight as the bobbin filled, and needed more friction. (Mr. Slater ran his first machinery by rope bands, for his carding machines, roping and drawing, as the use of belts was not then known in this country. The first leather belts I ever heard of were made by John Blackburn, when he was setting a mule in operation for Mr. Slater. Mr. Slater informed me that there had been a new machine for making yarn, invented in England, which was a mixture of the jack and jenny and the Arkwright Water Frame.)

I assisted the Anthonys in finishing and keeping in order their machine.

There being no cotton gins at the South, they (the Providence people above referred to) imported some of the cotton in seed, and picked it off by hand, which being in bad condition, and the machinery imperfect, they made some few tuns of yarn, and laid the machinery by. Moses Brown bought the machinery, and advertised in New York, which brought Mr. Samuel Slater to Providence.

Mr. Slater came out with Moses Brown, to my father's at Pawtucket, to commence an Arkwright Water Frame, and Breaker, and two Finishers, Carding Machines. I forged the iron work, and turned the rollers and spindles, in part. All the turning was done with hand tools, and by hand power, with crank wheels. When the card rims and wheels were wanting, I went with Slater to Mansfield, Massachusetts, to a furnace owned by a French gentleman, named Dauby, who came I think with Lafayett's army, who has a son and one daughter now living in Utica and Auburn. The card rims broke in cooling. Mr. Slater said the iron shrunk more than the English iron. I told him we would make a crooked arm, that would let the rim move round—the arms being carried one way, and when the hub cooled would return, and leave the wheel not divided against itself—which proves a remedy in all cases, if the arms are made the width the right way, to let the curve spring easy, with sufficient strength of iron. I told him cast iron broke more often by division in its own family, than by labor.

About the year 1786-7, my father bought the machinery for cutting iron screws, called the fly screws, for pressing paper—of Israel Wilkinson, of Smithfield, the son of Israel who built the Hope furnace for the Browns and others—and with the help of a Mr. Crabb, who was employed by the Browns, John, Joseph, Nicholas and Moses, in building the sperm candle works, on what is now called India Point. They used a screw of cast iron, about seven inches in diameter, and five or six feet long, which was cut by setting it upright, with a wooden guide screw, which was connected with an iron socket, with a mortise to hold the cutter, which was fastened with an iron wedge.

After Wilkinson had finished the candle works, with Mr. Crabb, he put in operation works for making screws, in Smithfield, and cut in the same manner as the English plan, brought over by Mr. Crabb. The old man (old Israel Wilkinson), went to different furnaces in Massachusetts, to mold his screws. There were no molders who would undertake it. My father had once seen old Israel Wilkinson mold one screw, and, after he had bought these old tools of young Israel, as he was called, and at a time when he wanted some molding done, he took me (then about fifteen years old) into his chaise and carried me to Hope furnace, about fourteen miles from Providence, in Scituate, to mold a paper-mill screw, as they had no molder at their furnace who would undertake to mold one. I had never seen a furnace in operation, or seen a thing molded, in my life. I molded three or four screws before I left for home. I stayed there about a month. The screws weighed about five hundred pounds each—were five-inch top, with cross holes seven inches diameter. They were cast in dried-clay molds, hooped and strapped with iron bands. I took the screws home to Pawtucket and cut and finished them there. They were made for Hudson & Goodwin, of New York, and Lazarus Beach, of Danbury, Connecticut. We made many screws of wrought iron for clothiers' presses, and oil mills but they were imperfect, and I told my father I wanted to make a machine to cut screws on centers, which would make them more perfect. He told me I might commence one. My father, in 1791, built a small air furnace, or reverberatory, for casting iron, in which were cast the first wing-gudgeons known in America, to our knowledge, for Samuel Slater's old factory.

[To be Concluded in our next.]

English Common Roads.

The editor of the *Wisconsin Farmer*, who is now in Europe, gives the description of the common roads in the Isle of Wight, and these are no better than the rest of the highways in England, Scotland and Ireland. He says:—"Of all public improvements, the roads appeared to us the most remarkable. They are mostly narrow, but the smoothest and handsomest we ever saw, inclosed with beautiful green hedges all the way, substantially macadamized with a surface as smooth as any sanded garden walk, and furthermore without any of those miserable ditches which make most roads in America so unpleasant and unsafe, they afforded us constant pleasure and made our afternoon pedestrianation of 14 miles seem but a single hour's promenade in some delightful park."

© 1862 SCIENTIFIC AMERICAN, INC.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page :—

Machine for Drying and Dressing Cloths.—The object of this invention is to obtain a machine by which woolen cloths, such as flannels, broadcloths, &c., may be subjected simultaneously to the process of tentering, drying, napping, brushing and pressing. To this end the invention consists in the employment of one, two, or more steam cylinders, with necessary carrying or guiding rollers, arranged with a hot-air chamber heated by steam pipes, a rotary blower, rotary tentering devices, and brush or napping cylinders. All arranged in such a manner as to operate conjointly and effect the result specified. David Henderson, of Merrimac, N. H., is the inventor, and his address is Thornton's Ferry, N. H.

Scroll Saw.—This invention consists in extending the cord or chain, from which the saw is suspended, on the rear edge or back of the same, and quite close to said edge, in such a manner that it (the cord) does not interfere with the motion of the work or material to be cut, in any direction whatever, and at the same time the saw can be strained or different plates inserted with the greatest facility. A. Giraudat, of New York city, is the inventor.

Sawing Down Trees.—The object of this invention is to produce a machine for sawing down trees, which can easily be transported from place to place, and which can be readily adjusted to suit different occasions. The invention consists in the arrangement of a longitudinally sliding frame provided with a steam cylinder, a feed motion and the necessary pulley to give motion to the saw in combination with a truck, running on wheels, in such a manner that the frame can be readily brought to the desired locality and position, and that by the action of the steam-cylinder the saw receives its desired motion ; it consists further in combining with each longitudinally sliding frame a series of rotary adjustable disks, in such a manner that the saw together with the driving pulley and feed motion can be set to any desired angle. L. S. Alder, of Cleona, Ind., is the inventor.

An Improved Evaporating Pan for Saline and Saccharine Liquids.—This invention consists in the arrangement of a double-chambered bed plate, in combination with a double set of C-shaped tubes which rise from a detached tube sheet in the interior of the pan, and which form a double connection between the two chambers of the bed plate in such a manner that steam introduced into one of said chambers passes through said C-shaped tubes into the other chamber, and that by the peculiar arrangement of said heating tubes an extensive heating surface, at different levels of the liquid, is obtained, and at the same time the water which may condense in said tubes readily runs off into one or the other of the chambers, and causes no injury to the apparatus by freezing, &c. ; and, furthermore, all the tubes can be easily cleaned on the outside, without breaking any joint whatever, and on the inside by removing the tube sheet. G. Stump, of New York city, is the inventor.

Portable Evaporating Apparatus.—This invention consists, first, in mounting the apparatus in a horizontal position on wheels, whereby it is rendered easily transportable. Second, in the arrangement of flues and air passage, in combination with a damper, whereby the temperature of the liquor in the finishing pan is easily controlled. Third, in the manner of conducting the liquor from the filter to the division in the front end of the evaporating pan. Fourth, in narrow strips or ribs attached to the inner sides of the evaporating pan, for the purpose of gathering the scum as the liquor flows in a zigzag course through it. Fifth, in the arrangement of the evaporating, finishing and clarifying pans. Sixth, in the manner of leveling the evaporating apparatus, by means of weighted indexes or pendulous arms. J. R. Webb, of Jackson, Mich., is the inventor.

Improved Process of Preserving Wood.—This invention relates to the preservation of wood by the carbonization of its surface, and it consists in subjecting such parts of the wood, used in any structure, for instance a ship, as it may be desirable to protect by such means, to the action of the flame of gas after they have been placed and united together. In performing the invention, the gas may be employed in a single jet, or in several jets from a burner or burners of any suitable kind, and the gas is supplied to the said burner or burners by means of a flexible pipe which allows them to be moved about to direct the flame over the different portions of the surface desired to be singed or carbonized. This process of carbonizing may be performed from time to time on the several parts of the structure, as its construction is proceeded with; for instance, in shipbuilding the frame may be carbonized before the planking or skin is applied, and the planking or skin be carbonized after it is in its place. The inventor of this process is H. de Lapparent, Paris, France.

ISSUED FROM THE UNITED STATES PATENT OFFICE.

FOR THE WEEK ENDING JULY 8, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,805.—L. S. Alder, of Cleona, Ind., for Improvement in Machines for Sawing Down Trees :

I claim, first, The arrangement of the longitudinally sliding frame, A, containing the driving pulley, F, feed motion, I J K L, or their equivalent, and a saw, H or H*, in combination with the truck frame, B, constructed and operating, substantially as and for the purpose set forth.

Second, The arrangement of the rotary disks, M O Q, in combination with the driving pulley, F, feed motion, I J K L, and saw, H, constructed and operating substantially as and for the purpose described.

35,806.—N. Aubin, of Albany, N. Y., for Improvement in Fluid Meters :

I claim, as of my own invention, a reversing apparatus and valve, or valves, constructed and acting under a mode of operation substantially as described, in combination with a cylinder or its equivalent, in which the flow of water is checked, or caused to cease by the stoppage of a motion of a ball or its equivalent for the purpose acting, substantially in the manner and for the purpose specified.

35,807.—J. A. Bassett, of Salem, Mass., for Improvement in the Manufacture of Gases for Illuminating and Other Purposes :

I claim preserving a uniform high temperature in the decomposing retort, by the employment of steam, superheated immediately previous to its introduction into said chamber, and introduced before its temperature is materially lowered, by means of apparatus constructed and arranged, substantially as shown and described.

35,808.—Samuel Boorn, of Lowell, Mass., for Improvement in Cushions for Shuttle Boxes :

I claim my improved cushion, as made of a combination of leather, india rubber and curled hair, arranged within a metallic case, B, in manner and for the purpose set forth.

35,809.—Timothy L. Carley and Amos Jackson, of Marcellus, N. Y., for Improved Water Wheel :

We claim the parts, C D E F G H I and J, when made as specified, and used for the purpose set forth.

35,810.—J. E. Daniels and G. S. Kendall, of Boston, Mass., for Improved Clothes Wringer :

We claim applying the pressure of the springs, G' and H, to the boxes, a, through the middle of the length of the bar, E, substantially as described.

35,811.—Henri de Lapparent, of Paris, France, for Improved Process of Preserving Wood :

I claim the carbonization of such parts of the wood or timber used in any structure, as it may be desirable to protect by such means, by subjecting the said parts to the action of the flame of gas, after they have been placed and united together in the structure, substantially as specified.

35,812.—J. C. Dow, of Henderson, Minn., and Ira Myrick, of Le Sueur, Minn., for Improvement in Parallel Rulers :

We claim the application of springs made of metal, rubber or any other suitable material, to a parallel ruler, in the manner and for the purposes described.

35,813.—A. A. Drake, of Flanders, N. J., for Improved Power for Churning :

I claim the churn-dasher stem, n, beam, m, drum, d, gear wheels, e f g h, shaft, i, flywheel, j, cord, B, pulleys, a b c, and weight box, E, when combined in the manner and for the purpose shown and described.

[The object of this invention is to produce a cheap and reliable power for operating churns or other small implements or machines, by means of a weight acting on a suitable mechanism.]

35,814.—J. A. Freese, of Hanover, Ohio, for Improvement in Corn Planters :

I claim the seed cell or hopper, E, one or more, placed in the rim of the wheel and provided with the slide, F, having the spring, i, attached, in combination with the adjustable inclined plane, G, attached to the frame of the machine, all arranged for joint operation, as and for the purpose specified.

[This invention relates to an improved corn planter, of that class designed for planting corn in hills, and which have their seed-dropping mechanism under the control of the operator, so that the seed may be planted in check rows, or at equal distances apart, in both directions, to admit of the rows of plants being properly tilled or cultivated, by a plow or cultivator.]

35,815.—J. Geiss, J. Brosius and W. P. Penn, of Belleville, Ill., for Improvement in Harvesters :

We claim, first, Making the finger bar flat, and sloping the front and rear edges thereof backward and downward, so as to give the cross section of the bar a rhomboidal form, as represented.

Second, We claim the shoulder piece, J, in combination with the finger, when said finger is made open on the under side thereof, so as to leave an open space at the rear of the sickle bar under the fingers, in the manner shown and described.

Third, We claim the screw, B, the sector, A, the main shaft, D, and the main frame, C, when these several parts are constructed and arranged in relation to each other, as set forth.

35,816.—Joseph Gill, of Willistown, Pa., for Improved Washing Machine :

I claim the arrangement, adjustment and combination of the levers, rods and arms, acting in connection with the concave corrugated-segmental tube and the rubber, as set forth and described.

35,817.—A. Giraudat, of New York City, for Improvement in Scroll Saws :

I claim the employment or use of a cord, F, composed in whole or part of fine steel wire, and so arranged as not to interfere with the motion of the work to be cut, by passing it through the saw kerf, and close to the back of the saw, in the manner described.

35,818.—J. A. Goewey, of Albany, N. Y., for Improvement in Tea Kettles :

I claim the combination of the stem, f, and socket, b, with the flange, k, of the tea kettle cover, so arranged that when the cover has moved over the opening in the kettle, the flange, k, will fall therein, substantially in the manner and for the purposes described.

I also claim attaching the cover to the tea kettle by means of the stem, f, and socket, b, in such a manner that when the bail, D, is raised, it cannot be removed from its place, substantially as described.

35,819.—J. S. Hall, of Pittsburgh, Pa., for Improvement in Plow Shares :

I claim drawing and bending a plowshare out of a single piece of steel or iron, that shall have a blade, B, and cutter, A, upon it when finished, substantially as described.

35,820.—B. F. Harriman, of Warner, N. H., for Improvement in Cheese Press :

I claim the arrangement of one or more pulleys, D, under the center of the movable frame, C, in combination with the pulleys, E, windlass, G, and with the stationary table, A, constructed and operating, substantially as and for the purpose shown and described.

[This invention consists in the arrangement of a series of pulleys, in combination with the movable frame and with the stationary table, in such a manner that one or more of said pulleys shall be attached to the center of the bottom crossbar of the movable frame, to move up and down perpendicularly with said frame, each end of which moves precisely alike, so that the top crossbar of said frame is always parallel to and square with the table upon which the cheese is placed, thereby securing an even downward pressure.]

35,821.—G. E. Hayes, of Buffalo, N. Y., for Improvement in Fastening Covers to Vulcanizing Flasks :

I claim, first, The arrangement of two or more set screws, e, in combination with the screw ring, C, cover, A, and cylinder, B, as and for the purpose shown and described.

Second, The projecting flange, f, projecting from the under side of the cover, A, and catching on the inside of the cylinder, B, as and for the purpose specified.

[This invention consists in the employment of two or more set screws passing through a screw ring, which screws on the upper edge of the cylindrical vulcanizing vessel, and which bears down on the edge of the cover, in such a manner that by means of the set screws acting in conjunction with the screw ring, a perfectly steam-tight join t between the cover and cylinder, is produced.]

35,822.—Isaac Hayes, of Philadelphia, Pa., for Improved Water Wheel :

I claim the employment of the tapering, spiral tubes, A A A, in combination with the central chamber, C, and continuous supply pipe, D, the same being arranged to operate together, in the manner described, for the purpose specified.

35,823.—David Henderson, of Merrimac, N. H., for Improvement in Machines for Dressing and Drying Woolen Cloths :

I claim the combination of the brush or napping cylinders, I I, steam cylinders, D D, rotary blower, H, rotary tender wheels, L L, receiving roller, M, and pressure roller, N, all arranged as and for the purpose specified.

[An engraving of this invention will shortly appear in our columns.]

35,824.—J. L. Henry, of the District of Columbia, for Improvement in Projectiles for Rifled Ordnance :

I claim, first, Combining one or more flexible bands with a projectile for rifled ordnance, in any manner, substantially as described and shown, for the purposes set forth.

Second, Two or more separate sets of gas channels, c, leading from the cavity, d, in the base of the projectile, to the under surface of two or more bands combined with the projectile, substantially as and for the purposes set forth.

Third, Causing a portion of the bands, as set forth, or the metal which secures them to the shot, to neatly fit the bore, for the purposes set forth.

Fourth, I claim the combination of an inflexible stop or rest, with a concussion piston, arranged substantially as set forth, for the purpose described.

Fifth, I claim the use of gas chambers beneath a band or bands, so proportioned as to contain just sufficient gas to cause the band or bands to effect the end desired, for the reasons set forth.

Sixth, I claim combining a percussion piston with a shell, substantially as described and shown, so as to render unnecessary a spring or other equivalent, heretofore used to prevent accidental explosion.

Seventh, I claim combining an anvil screw or its equivalent with a shell, in the manner substantially as shown, and for the purposes set forth.

Eighth, I claim the combination of the percussion piston and anvil screw, with each other and with the shell, substantially as and for the purposes set forth and shown.

Ninth, I claim combining a screw or its equivalent with a shell, so as to admit of being adjusted from the outside of the shell, to expose the cap within, substantially as set forth.

35,825.—W. W. Hubbell, of Philadelphia, Pa., for Improvement in Projectiles for Rifled Ordnance :

I claim, first, Extending the facing of copper or similar metal forward of the soft metal filling, and around the cylindrical hard metal body of the projectile, so as to secure the facing more firmly, while the soft metal shall expand outward, with the back part of this metal facing into the rifle grooves of the gun, substantially as described.

Second, In further securing the removing or expanding portion of the soft metal by the coil of wire in the front part of the metal within the groove, d, as described.

Third, Also, in strengthening that part of the soft metal which expands, by casting it around the tinned sheet-iron ring, with slits or otherwise, to expand with the soft metal and hold on to it at the muzzle of the gun, substantially as described.

Fourth, Also, in further securing the copper or outer facing to the soft metal, by forming the annular groove, c, in it, with the lead filling underneath and behind it, substantially as described.

35,826.—Allen Judd, of Springfield, Mass., for Improvement in Steam Engines :

I claim one or more cylinders, with piston rods to match them, applied to a fly wheel, the cylinders being hung to the wheel in such a manner as to be permitted to vibrate, and the piston rods to be hung at one end to a stationary shaft set within said wheel, one side from its center, so as to give a vibrating motion to each cylinder and its piston rod, as they revolve with the wheel, and give a propelling force to it by the pressure of steam, all as shown.

35,827.—D. F. and A. P. Luse, of Spring Mills, Pa., for Improvement in Stump Extractor :

We claim the combination of the lever, G, with the racks, F F', when each of the said racks act alternately as the fulcrum of the said lever, and when both are allowed to change their line of draught by means of the rounded block, A, and beveled mortises, e e, substantially as described.

We also claim the combination of the segment, i, pin, l, and rod, n, as and for the purpose specified.

35,828.—John McLaughlin, of Monongahela City, Pa., for Improvement in Straw Cutters :

I claim the straw box, a, furnished with slides, m, said box having horizontal and oscillating movements, in combination with rod, l, cam, e, frames, f and h, and strap, i, arranged constructed and operated in the manner described and for the purpose set forth.

35,829.—J. L. McPherson, of Sacramento City, Cal., for Improvement in Pumps :

I claim, first, The movable box, C, in the lower part, B, of the pump cylinder provided with the tube, D, and valve, F, and arranged as shown to admit of a chamber, E, around the tube, D, within box, C, as set forth.

© 1862 SCIENTIFIC AMERICAN, INC.

Second, The central valve tube, H, in the plunger box, G, in connection with the inner inclined side of the plunger box and inclined or inverted cone-shaped end, m, of the tube, J, for the purpose of forming a chamber, L, around tube, H, and also for the purpose of securing the packing, K, to or in the plunger box, as described.

Third, The tube, J, arranged and applied to the plunger box, G, and within the pump cylinder as shown, performing the triple function of a plunger rod, air chamber and buoy, as set forth.

Fourth, The lever, P, when arranged as shown, to be capable of being made fixed or to rock, and used in connection with the lever, O, and tube, J, as and for the purpose specified.

[The object of this invention is to obtain a pump which may, by a very slight manipulation, be changed from a force to a lift or suction pump and *vice versa*, and also possess the advantage of not being liable to become choked by sand, and by a very simple construction and arrangement of parts, have its plunger rod and air chamber and a buoy combined, so that each of the aforesaid elements will perform its proper function equally as well as if they were applied separately in the ordinary way.]

35,830.—Louis and Jacob Miller, of Canton, Ohio, for Improvement in Harvesters:

We claim, first, The combination and arrangement of the jointed pulley supporters, j l, between the drive wheel and reel shaft, so that the reel may accommodate itself to the raising and lowering of the platform, and be susceptible of being raised or lowered on the reel post without slacking the belt or belts, substantially as described.

We also claim in combination with the hanger, the split or divided journal box, and adjusting device connected to it, so that the journal box as it wears away in the direction of the resistance of the pitman or cutters, may be set up to the shaft that works the cutters, substantially as and for the purpose set forth and explained.

35,831.—J. C. Moore, of Peoria, Ill., for Improvement in Corn Planters:

I claim, first, The arrangement of the swivel joint, a, and guiding buffers, e f, in combination with the frame, A, supporting the driver's seat, D, and with the frame, B, carrying the seed-dropping mechanism, constructed and operating as and for the purpose shown and described.

Second, The arrangement of the lever, I, in combination with the hinged frames, A B, constructed and operating as and for the purpose set forth.

[This invention consists in the arrangement of two frames, one supported by the wheels, and the other which carries the seed-distributing mechanism, supported by the runners or plows, said frames being connected by a swivel hinge in the center and guiding buffers on both sides, in such a manner that each frame can accommodate itself to the inequalities of the ground independent of the other, and that by weighing down on the rear end of the after frame the central portions of both frames are raised, and the plows are thrown out of the ground.]

35,832.—Franklin Muzzy, of Bangor, Maine, for Improvement in Machines for Sawing Shingles and Other Lumber:

I claim, first, Reversing the reciprocating vertical action of the carriage for feeding the bolt to the saw, automatically by the operation of the mechanism or its equivalent, connected with the vibrating shaft, P, substantially as described.

Second, The combination of the latches, c d, pressure cam, a, and pivoted standard, f, operated by either weights or springs to throw the pinion, p, in and out of gear, substantially in the manner explained.

Third, The combination of the lever, i, pawl, i′, and wheels, S1 and S2, actuated by suitable studs or cams, m k, so as to move the racks, h h′, forward alternately or simultaneously as explained, in connection with a shingle machine carriage, moving in a direction so nearly perpendicular as to present the center of the shingle block to the upper half of the saw, substantially as set forth.

Fourth, The gage lever, 2, and trip lever, 5, employed in combination with the latch, d, to regulate the motion of a shingle machine carriage, moving so nearly perpendicular as to present the center of the shingle block to the upper half of the saw, substantially as set forth.

Fifth, The combination of the stud, R, slide, R1, and hooks, R2 R3, operating in the described connection with the head block, N, and trip lever, 5, to arrest the motion of the carriage when the bolt is worked up.

[This is a machine completely automatic in its character, and adapted to produce shingles and other articles of moderate size, with very great rapidity. An engraving of this machine will be soon published in these columns.]

35,833.—Cæsar Neumann, of Boston, Mass., for Improvement in Mittens:

I claim so forming and constructing a mitten or covering for the hand, that the part which covers the fingers is susceptible of being turned back upon the hand so as to leave the fingers free without entirely removing the mitten, substantially as described.

I also claim forming a slit in the thumb covering, so that it may be turned back upon the mitten and leave the thumb free, substantially as described.

35,834.—William Painter, of Fallston, Md., for Improvement in Counterfeit-Coin Detectors:

I claim the particular arrangement of the horizontal plate, A, vertical plate, a, inclined plane, b, and spout, I, provided with the slide, c c, and stop, g, and suspended between the pendent yielding rods, d d, substantially as and for the purpose set forth.

[The object of this invention is to obtain a counterfeit-coin detector, which will admit of being applied to a counter or table directly over a receptacle, and serve as a means for conveying the genuine coin into the drawer, and at the same time serve as a means to detect spurious coin that may be placed into it for the purpose of being passed into the drawer, thereby avoiding any waste of time in testing coin, as is now the case in using the various detectors hitherto devised.]

35,835.—L. C. Ober, of Boston, Mass., for Improvement in Lanterns:

I claim the arrangement of india rubber or other elastic packing between the deflector, supporter and glass casing of the lantern, whereby the currents of air are prevented from passing up between the said supporter and the casing, and are caused to flow into the deflector, and through and around the outer surface thereof, substantially in manner and for the purpose set forth.

35,836.—W. P. Penn, Jacob Geiss and Jacob Brosius, of Belleville, Ill., for Improvement in Harvesters:

We claim, first, The bracket, B, the circular plate, E, the main shaft, C, the lever, F, the main frame, A, and the driver's seat, G, arranged in respect to each other, substantially in the manner described for the purpose specified.

Second, In combination with the reel post and shaft, S, journal box, R, and screw Q, the spring, P, as shown and described for the purpose specified.

Third, We claim adjusting the caster wheel, k, by means of the perforated arms, L, perforated segment, M, and pin, f, in the manner and for the purpose shown and described.

35,837.—James Perry, of Brooklyn, N. Y., for Improved Apparatus for Measuring Out and Discharging Dough, Under Pressure:

I claim, first, The employment of a piston and cylinder, in combination with means for varying the extent of the motion, for the purpose of measuring out the exact quantity of dough to form the several-sized loaves, and to regulate the flow thereof, substantially as set forth.

Second, Regulating the force of the discharge of the dough from such cylinder by the application of a greater or less resistance to the motion of the piston, for the purpose set forth.

Third, The use of an internal cylinder having a partial rotating or equivalent movement, in combination with a piston moving in accordance with internal pressure in the kneading machine, for the purpose above specified.

Fourth, The employment of a receptacle interposed between the kneading vessel and a discharger, so as to promote the effective operation of the latter, and to prevent the escape and loss of gas, substantially as set forth.

35,838.—Jacob Reese, of Pittsburgh, Pa., for Improvement in Furnaces for Coal-Oil Stills:

I claim the mode described, of constructing stills, the bottom of which is composed of more than one piece, and furnaces therefor, in such a manner that all the joints, seams and rivets which are placed inside of the fire chamber, shall rest upon or be covered by walls or supports of brick work or cement, and thus protected from the direct action of the fire, substantially in the manner and for the purpose set forth.

35,839.—J. R. Robertson, of Syracuse, N. Y., for Improvement in Vegatable Cutters:

I claim the combination of the box, A, hopper, a, and cylinder, C, with its cutters, constructed and arranged substantially as described.

I also claim leaving the ends of the cylinder open for the escape of the cut matter, when said cylinder is constructed with its cutters, arranged as described and combined with the hopper, substantially as and for the purposes set forth.

35,840.—G. C. G. Saur, of Washington, D. C., for Improved Hair Dye:

I claim the wash, No. 1, and solution, No. 2, when compounded and applied, substantially as and for the purpose described.

35,841.—C. G. Schneider, of Washington, D. C., for Improvement in Chamber Buckets:

I claim securing the cover, E, to the annular head or top, B, of the vessel by means of the handle, G, the crossbar, K, which is secured to the lower end of the shank, F, of said handle, the spring, m, which embraces the said shank of the handle above the cover, and the offsets, D D, from opposite sides of the inner periphery of the said ring-shaped top, B, of the vessel when the said parts are arranged and are made to operate substantially in the manner and for the purpose set forth.

35,842.—Jehyleman Shaw, of Bridgeport, Conn., for Improved Apparatus from Saving Silver from Waste Solutions:

I claim, first, Attaching to the waste pipe of the sink or basin, into which persons using silver in solutions suffer them to be wasted; a vessel so arranged and constructed that the liquids passing from the sink shall run into, through and out of said vessel, and between the time of entering said vessel and escaping therefrom, shall be brought into contact with such chemicals or metals as will cause the whole or any part of the silver contained in solution to be precipitated and retained in said vessel, while the worthless material is allowed to escape.

Second, I claim the use of the filter, B, or its equivalent, for the purpose of preventing small particles of silver from escaping after the liquids have been brought into contact with the chemicals, as described.

35,843.—Zadok Street, of Salem, Ohio, for Improvement in Brick and Tile Machines:

I claim, first, The combination of the sliding gate, E, follower, H, hinged thereto by its inner edge and lever, h, constructed arranged and operating in the manner described, to first separate the clay in the box, D, from that within the the mill, A, and afterward press the former downward and outward into the molds, I; all as specified.

Second, The wire cut off, K, so arranged and operated by means of bars, L, and guides l l, as to separate the surplus clay from that pressed into the molds, as described.

[This invention consists in certain devices by which the clay is equally distributed throughout the molds, and after being pressed therein, the surplus clay is smoothly separated before the withdrawal of the molds. By these means bricks and tiles of symmetrical form and smooth surface are produced.]

35,844.—George Stump, of New York City, for Improvement in Evaporating Pans for Saccharine Liquids:

I claim the arrangement of the double chambered bed plate, B, in combination with the detachable tube sheet, C, double set of C-shaped heating tubes, E E′, and pan, A, all constructed and operating substantially as and for the purpose shown and described.

And I also claim the double set of C-shaped heating tubes, E E′, bent at different hights and at different widths, in combination with the pan, A, as and for the purposes specified.

35,845.—Matthias Frank, of Philadelphia, Pa., for Improvement in Relieving Steam Boilers of Cinders:

I claim the combination and arrangement to relieve combustion chambers of steam boilers, or that part of the boiler between the furnace and flue sheet of ashes or cinder, substantially as represented and operated for the purpose set forth.

35,846.—T. R. Timby, of Worcester, Mass., for Improvement in Revolving Battery Towers:

I claim a revolving tower for land or water, designed for offensive or defensive warfare when combined with an independently rotating shaft, upon the top of which is arranged the commander's platform or station, as described.

35,847.—T. R. Timby, of Worcester, Mass., for Improvement in Discharging Guns in Revolving Towers by Electricity:

I claim, first, Arranging a telescopic or other sight, or an index on a platform capable of revolving independently of the tower in a direct vertical plane over a circuit closer or a series of them, having metallic connection with a bar attached to, but insulated from said revolving shaft, as and for the purpose specified.

Second, Making the independently-revolving shaft, in connection with the metallic structure of the tower, a part of the electric circuit, as described.

Third, Attaching to and insulating from said revolving shaft, a vertical bar revolving therewith, to which is metallically attached one or a series of circuit closers, and which forms another part of the electric circuit, as set forth.

Fourth, Placing the battery on or under the commander's platform, so that it shall revolve therewith, the poles of the said battery being connected with the shaft which carries the said platform and the attached but insulated bar, as and for the purpose described.

Fifth, The described construction of the circuit closers, operated by springs so as to be allowed to pass each other, and then revert automatically to their original position.

Sixth, The form and construction of the platinum wires whereby the electric circuit is preserved, and the vent or fuse penetrated, as set forth.

Seventh, The arrangement of the conducting wires whereby in connection with the tower, the shaft, platinum, wires, bar and circuit closers, the electrical circuit is completed, as described.

35,848.—W. H. Towers, of New York, for Improvement in Skeleton Skirts:

I claim combining a hoop skirt and corset, with bustle attached, in one garment, in the manner and for the purpose set forth.

35,849.—R. D. Turner, of New York City, for Improvement in Car Coupling:

I claim the use of the permanent pins, K K′, the links, I I′, and the hinged catches, B B′, when arranged with the bumper heads, A A′, of said coupling, in such a manner that the said parts are enabled to jointly operate with each other, substantially as set forth.

I also claim the permanent attachment of a link to each bumper-head of my improved car coupling, when a vibrating catch is pointed to each of the bumper heads, substantially in the manner and for the purpose set forth.

When a vibrating catch, B, and a link, I, are permanently connected with each bumper head or my improved car coupling. I also claim closing the mouth of the catch-receiving slot in the upper side of the mouth of the said bumper head, by means of the flanged projection from the head of the said vibrating catch substantially as represented in the drawings.

I also claim giving such a shape to the head portion of each hinged catch B, or B′, as will prevent it from being elevated to a higher position than that represented in the drawings; but this I only claim when the vibrating catches, B B′, and the links, I I′, are combined with the bumper heads, A A′, in the manner represented in the drawings.

35,850.—A. H. Van Geison, of Newark, N, J., for Improved Leather-Splitting Machine:

I claim, First, The combination of the bed, I. fingers, 2 2, gage, 6, gage, 25, and roller, 5, constructed and operated as described.

Second, The combination of the bed, I, fingers, 2 2, gage, 6, gage, 25 and roller, 5, with the knife, 7 and rollers, 9 and 10, as set forth.

35,851.—Louis Wacker, of Buffalo, N. Y., for Improvement in Lining Billiard Cushions:

I claim the the combination of the covering, C, of raw hide, prepared in the manner specified, with the billiard cushion, B D E d, constructed and arranged as shown and described.

[By means of this invention a cushion is produced, the elasticity of which is but little affected by wear, or by atmospheric changes.]

38,852.—J. A Whitney, of Maryland, N. Y., for improvement in Harvesters:

I claim, first, The combination of the sickle and its driving mechanism, with the swinging frame, G, constructed and operating in connection with the main frame, A, and geared wheel, j′, substantially as shown and described; so that when the front end of said frame is raised, the vibrations of the sickle will cease; and when said frame is allowed to descend, the driving mechanism of the sickle will fall into gear by its own gravity; all as set forth.

Second, The combination of the lever, F, with the swinging frame G, and the driver's seat, D, as shown and described; so that when said lever is pushed forward, the sickle will be raised and its vibrations will be stopped; and when said lever is pulled backward in the manner described, the sickle may be temporarily raised without stopping its vibrations; all as set forth.

[The object of this invention is to obtain a mowing machine that wil be extremely simple in construction, very durable, operate with but little or no side draught, and capable of having its cutter adjusted with facility to cut at any desired hight; and also readily elevated temporarily to pass over obstructions, as well as be capable of being readily secured in an elevated state, so as to be free from the ground to admit of the machine being drawn or moved from place to place.]

35,853.—Charles Burleigh (assignor to Putnam Machine Company), of Fitchburg, Mass., for Improvement in Friction Pulley:

I claim the loose pully, B, in combination with the expanding ring, D, connected with the shaft, A, and operated substantially in the manner specified

35,854.—J. F. Greene, of Warwick, R. I., assignor to S. T. B. Tobey, of Providence, R. I., for Improved Water-Proof Fabric:

I claim the combination of the disintegrated fibres of felt, or fur, with a surface of India rubber, either in sheets or when attached to a base of textile or felted fabrics, or to leather, so as to form a new evenly-napped water-proof fabric, substantially as described.

35,855.—J. F. Greene, of Warwick, R. I., assignor to S. B. Tobey, of Providence, R. I., for Improved Machine for Manufacturing Water-Proof Fabrics:

I claim the combination of the calender rolls, the machine for sifting fibrous flocks and the brushes to cause the fibres to be laid straight and to move the surplus, operating upon a fabric composed of a sheet or surface of india rubber, attached to cloth or other material, as a base, and producing a napped or flocked india-rubber fabric by one operation, substantially as described.

35,856.—J. M. Horton (assignor to J. H. Humphrey), of Albany, N. Y., for Improvement in Shank Socket for Auger Handles:

I claim the band, A, with its projecting cylinder, C, having a screw-thread cut upon it, and having the recesses, a and b, formed therein to receive the grips, the grips B and D, formed and fitted as described.

The nut, N, fitted to the screw-thread of the cylinder, the whole arranged and combined substantially in the manner and for the purpose set forth in the specification.

35,857.—E. R. Scott (assignor to himself and W. L. Germon), of Philadelphia, Pa., for Apparatus for Producing Vignette Photographs:

I claim, first, The combination of the frame, A A, with elevated sides, B B, sliding-plate, C, oval opening, D, and ground-glass, E.

Second, Making the plate, C, which contains the oval opening, slightly elevated above the glass negative.

Third, The use of a sliding plate, X, to cut off the lower portion of the oval, if desired.

35,858.—Joseph Sedgebeer (assignor to himself and James L. Haven), of Cincinnoti, Ohio, for Improvement in Mill-Stone Dress:

I claim a mill dress, consistimg essentially of a series of graduated Y-shaped figures, arranged radially upon the grinding plate, whether horizontal, vertical, or conical, substantially as and for the purpose set forth.

35,859.—C. W. Trow (assignor to Cyrus Wakefield), of South Reading, Mass., for Improvement in Ratan Machinery:

I claim the employment, in combination with feeding rollers, of a series of self-adjusting scraping knives, constructed, arranged and operating as described, to close against the surface of the ratan whatever its diameter may be, and yield to all inequalities other than the knots or excrescences, as set forth.

I also claim the angular marking and dressing knives in combination with the feeding mechanism of ratan machinery, substantially as described,

I also claim the combination with the knives provided with the dressing, cutting edges of a tubular coring cutter, arranged substantially in the manner and for the purposes set forth.

I also claim the combination and arrangement of the apparatus described, performing the several operations of dressing, splitting, coring and finishing the ratan successively and continuously in one machine, in the manner as set forth.

35,860.—N. W. Williams, of Frankfort, Pa., assignor through mesne assignments to himself, for Improved Lamp Burner:

I claim, first, The exterior casing, E, with its oblong opening, F, in combination with the elongated wick-tube, D, when so arranged and connected together as to leave an unobstructed opening below for the free admission of air to the chamber between the casing and the tube, as set forth for the purpose specified.

Second, Flaring the lower end of the casing, E, so as to overhang the cover, A, and permit the gases passing from the reservoir at the point where the cover is secured to the same to pass upward into the chamber, P, as set forth.

Third, I claim securing the exterior casing to the wick tube by means of strips, i, bent from and forming part of said casing as specified.

35,861.—E. L. Wilson (assignor to C. H. Morgan) of Philadelphia, Pa., for Picture Envelope:

I claim an envelope constructed with an opening through one of its sides, in combination with a flap adapted to cover said opening, substantially as set forth.

35,862.—J. R. Webb, of Jackson, Mich., for Improved Portable Evaporator for Saccharine Juices:

I claim first, Mounting the evaporating apparatus on wheels, in the manner and for the purpose substantially described.

Second, The flues, h t i b, and air passage, n, in combination with the damper, l, when arranged under the finishing compartment, f g, in the manner and for the purposes set forth.

Third, The pipe, H, leading from the filter, r, to the front end of the evaporating pan, in the manner and for the purpose described.

Fourth, The combination of the strips or ribs, n′, attached to the inner sides of the evaporating pan, with the partitions, m, in the manner and for the purpose set forth.

Fifth, The described arrangement of the evaporating, finishing and clarifying pans.

Sixth, The combination of the weighted indexes or pendulous arms, J, with an evaporating apparatus, when arranged in the manner and for the purpose set forth.

35,863.—R. R. Moffatt (assignor to himself and Hannah Hortley), of Lacrosse, Wis., for Improvement in Breech-Loading Ordnance:

I claim, first, In combination with the breech of the gun, the hinged breech piece and pin, and strap, B, substantially in the manner described for the purpose specified.

Second, In combination with the lever, C, and hinged breech piece, the chain H, substantially in the manner described for the purpose specified.

Third, In combination with the breech piece of the gun, and the strap, B, the lugs P, and recesses, F, substantially in the manner described for the purpose specified.

Fourth, In combination with the breech of the gun and the circular groove, v, in the breech piece, the shoulder, g, substantially in the manner described for the purpose specified.

RE-ISSUE.

1323.—N. K. Wade & Jos. Kaye, of Pittsburgh, Pa., for Improvement in Car Wheels. Patented September 4, 1860:

We claim the use in car wheels, having cast-iron rim and hub, of curved or bent spokes or arms of wrought iron, or other flexible ma-

© 1862 SCIENTIFIC AMERICAN, INC.

terials, so arranged or set relatively to the hub and rim, so as to brace the rim in a plane parallel to its axis, substantially as described.

DESIGN.

1,612.—William Boch, of Newtown, N. Y., for Design for Hand Frame for Fire-Work.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes n the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the nventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remi money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

W. J., of Canada West.—If a balloon inflated with hydrogen gas, had a hole cut in the bottom, the gas would not escape. It is the usual practice of aeronauts to leave the balloon open at the bottom. The gas would very slowly mix with the air, but probably not more rapidly at the opening than through the walls of the balloon.

J. P., of Ind.—We know of no way to blue gun barrels without heat, except to paint them. The assignment of a patent may be sent directly to us and we will attend to having it recorded.

W. F. S., of Ohio.—We suspect that any substance which would remove the odor from glue, would injure its adhesive properties.

X. Y. Z., of Pa., is informed that we cannot undertake to reply to his inquiries until he furnishes us with his proper address. He must restate his case and sign his name to his letter, or it will receive no attention.

J. H. P., of Mo.—If parties are infringing your patent, you can prosecute them only through the United States courts Your State courts have nothing to do with such questions. There is a United States district judge residing in St. Louis.

N. D., of Mass.—If an irresponsible person is manufacturing your patented invention, you can stop him by injunction. If responsible parties are using it without authority you can sue them for damage

J. A. P., of Vt.—There is no known solvent of calomel. It may be held in suspension in a solution of mucilage.

M. S. B., of Mass.—Soap affects india rubber to about the same extent as grease. Hard rubber being more highly vulcanized than soft, is less affected by either grease or soap, and would probably serve very well for an oil can, or for a box to contain shaving cream. In the back volumes of the SCIENTIFIC AMERICAN you will find engravings of several devices for adjusting the cutting edge of planes, by means of screws.

H. G. D., of Mo.—About the first steam fire engine of which we have any knowledge in this country, was the invention of William L. Lay, of Philadelphia. An engraving of his engine was illustrated in the SCIENTIFIC AMERICAN of October 25, 1851.

H. G., of N. Y.—You will find an engraving and description of the Phillips Fire Annihilator on the first page Vol. VII. SCIENTIFIC AMERICAN (1851). Mr. Barnum, at the American Museum, we presume, can furnish you with the desired information in regard to them.

J. R. L., of Ohio.—At the Metropolitan Mills, in this city, there are 6 engines, 4 of which are used for grinding, and the work of 2 of these has been carefully recorded. They are of the same size, the cylinders 10 inches in diameter and 3 feet stroke, running 60 revolutions per minute, with a mean pressure on the piston of 75 lbs. to the square inch. They drive 7 runs of stones and grind 300 bbls. of flour in 24 hours. The stones are 4 feet in diameter, and run 180 revolutions per minute.

R. S. P., of Mich.—If a surveyor, beginning in latitude 45°, starts a line due east by compass, and then continues his line by plumb staves round one quarter of the globe, the latitude which he will reach will depend on the distance apart at which he sets his staves. As his latitude varies his staves will stand in different planes. For replies to your other questions we advise you to consult a celestial globe. Imagine the earth in the center and then place the sun on the ecliptic, to correspond with the different dates under consideration.

A. B. T., of Mich.—Iron weighs a little more in a vacuum than in the atmosphere. The difference will be 6326th part of any amount in a perfect vacuum, A cubic foot of iron weighs 475 lbs., a cubic foot of water 62½ lbs. Air is 815 times lighter than water.

D. W., of R. I.—Several house fire alarms have been described in the SCIENTIFIC AMERICAN. One, which gives the alarm by striking a bell, is illustrated on page 392 of our last volume.

F. S. C., of Mass.—The principal value of bronze figures, like that of marble statuary or oil paintings, is due to the artistic skill with which they are executed. You can bleach a straw hat or bonnet by first washing it well with soap and water to remove all the grease and dirt, then immersing it for about half an hour in a weak solution of oxalic acid, and then allowing it to become dry by hanging it in the open atmosphere. The finishing operation consists in placing it in a close wooden box, and submitting it for two hours to the fumes of burning sulphur. This is the most improved method practised by straw-hat bleachers. A roll of sulphur is placed upon the top of some red hot coals in a small furnace situated in one corner of the sulphur box. This mode of sulphuring straw hats will also bleach white flannels which have become yellow by wearing and washing.

H. M. D., of Ohio.—You will find answers to your several inquiries respecting the distillation of petroleum, in the series of articles now being published on this subject in our columns.

H. G. L., of Ind.—As your slide valve has but one-fourth of an inch outside lap, it cannot affect its operation to any sensible extent, so far as it relates to lifting it off its seat by the exhaust.

N. B., of Pa.—By your plan No. 1, your water can be taken to your engine house with less than half the power that it can by plan No. 2. By your first plan you raise 25 feet, through 1,500 feet of pipe, and by your second you raise 85 feet, through 3,000 feet of pipe, but, as the latter is a syphon, e pressure of the atmosphere will lift the water 34 feet, leaving ou 51 feet to be overcome by your engine. The friction of the water, too, on the larger pipe, is twice as much as on the shorter one

A. D., of N. Y.—The sketch which you send us of Wilcox's engine is substantially correct. It was fully illustrated on page 161, Vol. VI. (new series) SCIENTIFIC AMERICAN. These engines are manufactured by Wilcox, Denison & Taylor, at Westerly, R. I. Air, like all other permanent gases, has its bulk at the freezing point doubled by being heated 491°, or if confined to the same bulk, its pressure is doubled. As the atmosphere at the level of the sea is under about 14 lbs. pressure per square inch, if this air is heated 491° its pressure will be about 14 lbs. per square inch above the atmospheric pressure.

W. I. McA., of Ohio.—We think a Fungi Pitt may be constructed as follows :—Dig a pit about from eight to twelve feet deep, in moderately dry soil, and cover it in such a manner as nearly to exclude all the light. You will have conditions favorable for the development of fungi in railway timbers. We are not acquainted with an English engineering work containing a description of such pits.

W. C., of N. Y.—The person who told you that "No piece of ordnance could be fired more than 700 times without receiving sufficient injury to render it unserviceable," is mistaken. An eight-inch gun, cast hollow at the Fort Pitt Works, as stated on page 393 of our last volume, has been fired 1,500 times, without receiving perceptible injury.

F. A. P., of Conn.—Grooved friction wheels have come into very general use in England, both in factories and machine shops. In practice they are said to operate most satisfactorily. Such friction gearing is used on the new Cunard steamer, *China*, on the hoisting engines.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, July 16, 1862:—

J. E. T., of N. Y., $20; B. D. R., of Iowa, $45; J. & G., of R. I., $45; J. B. D., of N. Y., $20; G. I. M., of Conn., $30; P. & S., of N. Y., $20; H. T. P., of Mass., $20; A. C. F., of Iowa, $20; C. O., of Ill., $20; N. & S., of N. H., $45; W. J. L., of Ind., $20; N. B. B., of Iowa, $20; C. E. S., of Wis., $20; C. F. W., of Pa., $20; C. M. S., of Mass., $45; J. W. P., of N. Y., $20; D. F. H., of Mich., $20; G. W. B., of N. Y., $35; A. S. B., of Conn., $45; J. N. E., of N. J., $10; S. F., of Ohio, $15; J. O'L., of N. Y., $30; O. F. K., of Conn., $15; D. H., of Ill., $10; J. G. H., of N. Y., $15; T. & N., of Mass., $20; T. A. H., of N. Y., $103; W. S., of N. Y., $12; C. G. A., of Mass., $25; C. W. G., & Co., of Mass., $15; A. B., of Mich., $25; S. R., of Mass., $15; T. J. K., of of Ohio, $15; H. T , of Ind., $15; F. H., of Conn., $15; D. Van H., of Ind., $15; S. E. T., of N. J., $15; H. G. T., of Mass., $15; M. R., of Mo., $25; E. & B., of Pa., $15; G. D., of Mass., $10; F. R. W., of Cal., $25; C. W. T., of Ill., $40; W. B. S., of Mass., $25; J. B. T., of Pa., $15; J. C. G., of Mass., $20; G. G. P., of N. Y., $15; B. & C. F., of Iowa, $15; A. M. B., of Iowa, $15; C. J., of Conn., $25; S. & C., of Mass., $25; R. & D., of Pa., $25; J. C. E., of Ohio, $15; N. S. H., of Mo., $15; J. W., of Iowa, $15; R. B., of Mich., $15; J. M. B., of N. J., $25; W. O. C. F., of N. Y., $25; H. N., of N. Y., $10; J. W. S., of N. Y., $25; J. B., of N. Y., $25; J. C., of N. Y., $12; C. H. P , of N. Y., $40.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from July 9 to Wednesday, July 16, 1862:—

G. W. B., of N. Y.; G. I. M., of Conn.; J. C., of N. Y.; W. S., of N. Y.; J. W. S., of N. Y.; J. B., of N. Y.; F. C. P., of N. Y.; C. G. A., of Mass.; J. O. L., of N. Y.; D. H., of Ill.; P. C. E. B., of N. Y.; H. N., of N. Y.; J. M. B., of N. J.; R. & D., of Mass.; S. & C., of Mass.; M. R., of Me.; W. B. S., of Mass.; F. R. W., of Cal.; W. O. C F., of N. Y.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V., VI. (NEW SERIES) COMplete (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Numbers 3, 4, 6, 8, 9, 10, 11, 12 and 16, of Vol. VI. are out of print and cannot be supplied.

Binding.

We are prepared to bind volumes in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express, or delivered at the office, 40 cents

© 1862 SCIENTIFIC AMERICAN, INC.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns ; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

MUNN & CO.,
Publishers SCIENTIFIC AMERICAN,
New York City

HEAT GAGES OR PYROMETERS, SUITABLE FOR hot-air blasts furnaces. Indicators for ascertaining the working horse power of steam engines, also for sale, Steam Gages, Glass Water Gages, Glass Tubes, Gage Cocks, Steam Whistles, &c. E. Brown, 311 Walnut street, Philadelphia, Pa. 1*

FISH'S NURSERY LAMP, AND TEA AND COFFEE Boilers.—State and County rights for sale. Agents wanted throughout the United States and Canada; descriptive circulars with engravings, &c. Price list sent to any part of the country. W. L. FISH, Newark, New Jersey. 4

"INVENTIONS AND THEIR RESULTS."—A NEW book just published. Send 2 stamps (6 cents), for a specimen copy. Agents wanted every where to distribute books and sell machines on a liberal salary. Address HARRIS BRO.'S, Boston, Mass. 4tf

WANTED.—A SITUATION AS FOREMAN IN A foundry, by a man of many years experience in that occupation. Satisfactory references given. Address GEORGE WATTS, Brooklyn, N. Y. 1*

MACHINISTS' TOOLS.—SECOND HAND LATHES, Planers, Drilling Machines and Shop Cranes. Apply to C. W. COPELAND, No. 122 Broadway, New York City. 4 4

PARTNER WANTED.—THE UNDERSIGNED BEING unable to work a valuable patent on a skate and on a buckle, desires to find a partner willing to furnish a small capital. Conditions liberal. PETER BAUER, 101 Catherine street, Newark, N. J. 1*

RIFLING MACHINES OF THE SPRINGFIELD PATtern now finishing and for sale by H. B. BIGELOW, New Haven, Conn. 2 4*

CIRCULAR SAW MILLS AND SHINGLE MACHINES of the most improved construction, embracing the patents of H. Wells & Co. JOHN H. LIDGERWOOD & CO., 175 Pearl street, New York. 1 8*

FOR SALE.—THE PATENT RIGHT FOR COX'S Rotary Engine and Force Pump, illustrated and described in the SCIENTIFIC AMERICAN of April 26, 1862. Address KENYON & THEODORE COX, No. 22 William street, New York City. 1 4*

BURDON, HUBBARD & CO. MACHINISTS.—MANUfacturers of Steam Engines, Sugar Mills, Saw and Grist Mills, Boilers, Hydraulic Presses, Pumps and Gearing for working mines, &c. &c. No. 102 Front street, Brooklyn, N. Y. 1 13

QUARTZ MILLS OF THE MOST APPROVED KIND. Manufactured by BURDON, HUBBARD & CO., 102 Front street, Brooklyn, N. Y. Also agents and manufacturers of the Russ Patent Premium Amalgamators, the best and simplest in use for saving both fine and coarse gold. 1 13

HARRISON'S GRIST MILLS—20, 30, 36 AND 48 inches diameter, at $100, $200, $300 and $400, with all the modern improvements. Also, Portable and Stationary Steam Engines of all sizes, suitable for said mills. Also, Bolters, Elevators, Belting, &c. Apply to S. C. HILLS, No. 12 Platt-street, New York. f

OIL! OIL! OIL!
For Railroads, Steamers, and for Machinery and Burning. PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 3tf

STEVENSON'S JONVAL TURBINE WATER WHEELS, which gave the greatest useful effect over all others, at the trials at Philadelphia, are manufactured by J. E. STEVENSON, at the Novelty Iron Works, New York. 3 6ow4*

COMBINED BAG HOLDER AND CONVEYER. WANTed by all who have bags to fill and handle.—Price $5 ; two for $9. Local and traveling agents wanted to sell or manufacture. State and county rights for sale. Send letter stamp for particulars. J. R. HOFFER, Mount Joy, Pa. 2 4*

MACHINIST'S TOOLS.—SECOND-HAND LATHES, Planers, drilling machines and shop cranes. Apply to C. W. COPELAND, No. 122 Broadway, New York City. 3 4

NEWBURY'S MACHINERY DEPOT, 16 MURRAY street.—Manufacturers and Dealers in Power and Hand Printing Presses, Proof Presses, &c., also new and second hand machinery Steam Engines, Bark Mills, Smut Mills, Hat Formers, Saw Arbors, &c. A. & B. Newbury, Manufactory, Windham Center, N. Y. 2 10*

TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 1tf

WINANS'S ANTI-INCRUSTATION POWDER (FIVE years in successful operation), effectually removes and prevents the scale in steam boilers, without injury or foaming. Cost 20 cents to 50 cents a week. Circulars with full particulars free. H. N. WINANS, No. 11 Wall street, New York. 25 5*

PICKERS.—RICHARD KITSON, HEAD OF WORTHEN street, Lowell, Mass.—Manufacturer of Kitson's Patent Cotton Mixer, Kitson's Patent Cotton Opener, Kitson's Patent Cotton Picker, Kitson's Patent Cotton Waste Machine and Rag Picker ; also Build's English Scutchers (pickers), of the following celebrated patterns:—Walker & Hacking, Lorg & Brothers, Taylor, Lang & Co., Manufactures Needle-Pointed Card Clothing, for Carding Hemp, Jute, Flax, &c. Parties in want of second-hand pickers can be informed where to procur them. 21 13*

NOTICE TO INVENTORS AND MANUFACTURERS. —We are the exclusive owners, under Goodyear's patent, of the rights to manufacture, use and sell Vulcanized India Rubber, "so far as it may or can be used," for rolls and coverings for rolls for washing, wringing and starching machines. We know that the "clothes squeezer" must be a necessity in every family so soon as known, and we desire to encourage other parties in the manufacture of it. We, therfore, license makers of good wringers upon liberal terms, and furnish them promptly with the best of rubber rolls—a large supply of which we keep constantly on hand. All parties infringing our rights will be prosecuted to the extent of the law. Address, METROPOLITAN WASHING MACHINE CO., Middlefield, Conn.
20 tf. DAVID LYMAN, Treas.

UNIVERSAL CLOTHES WRINGER.—WE BELIEVE this to be the most powerful, most durable, and most convenient wringer invented. Agents wanted to canvass towns and counties all over the United States. Address METROPOLITAN WASHING MACHINE COMPANY, Middlefield, Conn. AGENTS, R. C. Browning, No. 2½ Dey street, New York City, and Rubber Clothing Company, No. 37 Milk street, Boston, Mass. 20 tf

SOLID EMERY VULCANITE.—WE ARE NOW MANUfacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at our warehouse, or circulars describing them will be furnished by mail.
NEW YORK BELTING AND PACKING CO.,
14 13 Nos. 37 and 38 Park-row, New York.

LAUTH'S PATENT SHAFTING, PISTON RODS, MANdrels, Plates, &c., of iron or steel, Address the subscribers (who are the only manufacturers under Mr. Lanth's patents in the United States, and who have the exclusive control of said patents), for circulars containing statements of the results of experiments made by William Fairbairn, of Manchester, England, and Major William Wade of U. S. A., also other valuable testimonials. JONES & LAUGHLINS, Pittsburgh, Pa. 1y*

FULTON'S COMPOUND, FOR CLEANSING STEAM boilers of scale.—This article is powerful to remove scale, and will not injure the boiler. Western agents, WALWORTH, HUBBARD & CO., Chicago, Ill. Sole proprietor, E. H. ASHCROFT, No. 82 Sudbury street, Boston, Mass. 9 tf

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. Also one 50-horse steam engine, good as new, will be sold cheap. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
1 tf GUILD, GARRISON & CO.

MILL STONE DRESSING DIAMONDS, SET IN PATent Protector and Guide. For sale by JOHN DICKINSON, patentee and sole manufacturer, No. 64 Nassau street, New York City. Also manufacturer of Glazier's Diamonds. Old Diamonds re-set. 21 12*

COMBINED SHINGLE AND HEADING SAW.—UNEqualed for simplicity and economy of power and timber. Illustrated in No. 20, present volume, SCIENTIFIC AMERICAN. Address TREVOR & CO., Lockport, N. Y. 20 13*

ONE 50-HORSE STEAM ENGINE, AS GOOD AS new, will be sold cheap on application to GUILD & GARRISON, Nos. 55 and 57 First street, Williamsburgh, or No. 74 Beekman street, New York City 17 tf

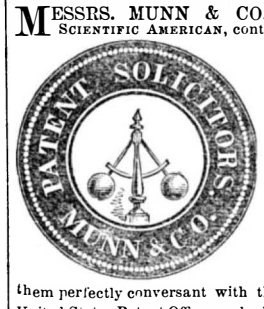
TERRYVILLE CLOCK SPRING COMPANY.—MANUfacturers of Polished Clock, Watch and Toy Springs, Terryville, Conn. 19 25*

THE CRAIG MICROSCOPE—PATENTED FEBRUARY 18, 1862, magnifying 100 diameters or 10,000 times, yet so simple that a child can use it. Sent by mail, postage paid, on receipt of $2 25. Liberal discount to the trade. Address HENRY CRAIG, 182 Centre street, New York City. Eight mounted objects will be sent for $1. 1 4*

MILLSTONE-DRESSING DIAMONDS, AND GLAziers' Diamonds. J. E. KARELSON, Manufacturer, No. 69 Nassau street, corner John street, New York City. 22 10*

IMPORTANT TO INVENTORS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Courts Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of sixteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, or sending a model or drawing and description to this office.



Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London, 29 Boulevard, St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office, or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents :—

MESSRS. MUNN & CO. :—I take pleasure in stating that while I held the office of Commissioner of Patents MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

MESSRS. MUNN & CO. :—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,
Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.

Communications and remittances should be addressed to
MUNN & CO.,
Publishers, No. 37 Park-row, New York.

BAIRD'S PATENT PREPARATION FOR THE PROtection of Steam Boilers from Incrustation.—It does not injure the metals; is a great saving of fuel; does not foam, and works equally well in salt and fresh water. For sale by JAMES F. LEVIN, No. 23 Central Wharf, Boston, Mass. New York depot, COLES & CO., No. 91 West street. 18tf

PUMPS! PUMPS!! PUMPS!!!—CARY'S IMPROVED Rotary Force Pump, unrivaled for pumping hot or cold liquids. Manufactured and sold by CARY & BRAINERD, Brockport, N. Y Also, sold by J. C. CARY, No. 2 Astor House, New York. 14tf

MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The Hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise at our warehouse. NEW YORK BELTING AND PACKING COMPANY.
JOHN H. CHEEVER, Treasurer,
14 13 Nos. 37 and 38 Park-row New York.

IRON PLANERS, LATHES, FOUR SPINDLE DRILLS Milling Machines, and other Machinist's Tools, of superior quality on hand and finishing, and for sale low. For description and prices address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 26

A MESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur languenatalie. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,
SCIENTIFIC AMERICAN Office. No. 37 Park-row, New York.

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

Munn & Co.,
37 Park Row, New York.

Auf der Office wird deutsch gesprochen.

Daselbst ist zu haben :

Die Patent-Gesetze der Vereinigten Staaten,

nebst den Regeln und der Geschäftsordnung der Patent Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St. sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

© 1862 SCIENTIFIC AMERICAN, INC.

Improved Lamp Heating Attachment.

Ever since the discovery of the inexhaustible oil wells in Pennsylvania, petroleum has been produced in quantities so large as to cause it to be offered at such very low prices that extraordinary efforts have been made to use it for heating as well as for illuminating purposes. Were it not for the disagreeable odor and the smoke which results from its combustion, it would afford a cheap substitute for the spirit lamp in chemical laboratories, and for gas in culinary operations; indeed, its very low cost would probably cause it to be used to a large extent for cooking in summer, in place of wood and coal. Many plans have been suggested for producing

Fig. 1

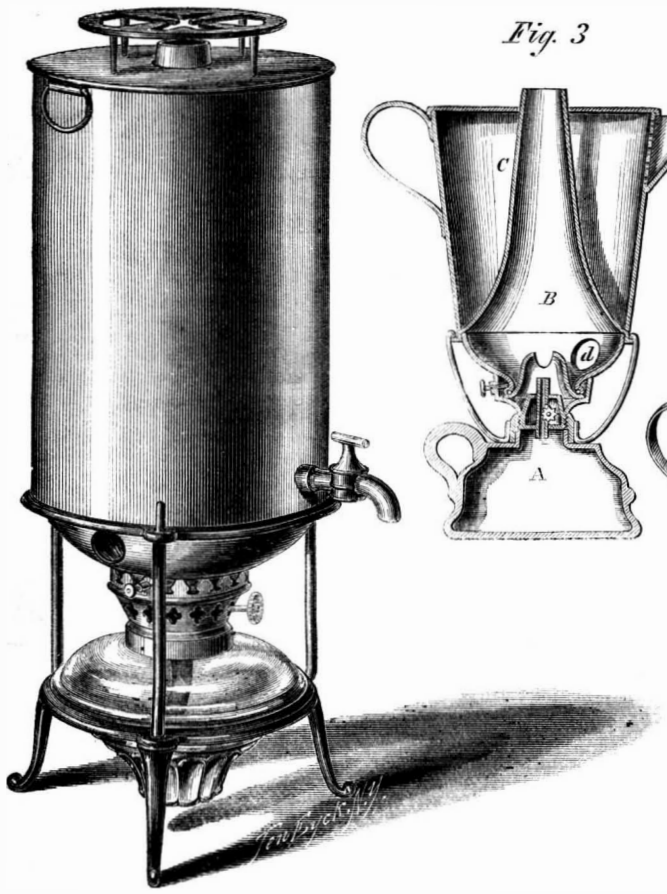


Fig. 3

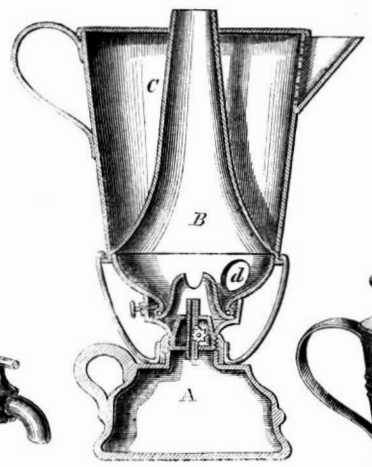


Fig. 4

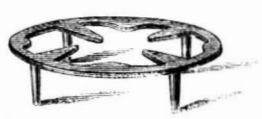


Fig. 2

FISH'S LAMP HEATING ATTACHMENT.

short, for any similar purpose where a large fire is not required.

The nursery lamp, after this plan, is claimed to be decidedly superior to all others. The chimney passing through the water causes a constant evaporation, which moistens the air of the room, while the light issuing from only one side of the lamp, permits it to be directed wherever needed, or to be obscured entirely. Either of the vessels may be used with gas as well as with oil, and for the nursery lamp the ordinary kerosene lamp is sufficient.

The patent for this invention was granted, through the Scientific American Patent Agency, June 17, 1862, and further information may be obtained by addressing the inventor, W. L. Fish, at 252 Broad street, Newark, N. J. [See advertisement on another page.]

so perfect combustion of rock oil that no smoke would be emitted, but, so far as we are aware, none of these has been entirely successful—at all events, in its application to heating purposes. By the plan which we here illustrate, the inventor claims the combustion to be absolutely perfect, so that not a particle of unconsumed smoke is left.

It consists simply in placing a metal chimney over the flame; and to avoid the great waste of heat which would occur by radiation from the walls of the chimney, the chimney is carried through the vessel to be heated. The engravings represent the plan as applied to a tea and coffee boiler, Fig. 1, and to a nursery lamp, Fig. 2; a section of the latter being shown in Fig. 3. A is the lamp, B the chimney, and C the vessel of water surrounding the chimney. A hole is made in the side of the chimney on a level with the flame, and filled with a plate of mica, through which the flame may be observed in adjusting its hight to give just the amount of heat required. As a considerable portion of the heat passes up through the chimney, arrangements are made to utilize this heat which would otherwise be lost. Accordingly, a light iron stand, Fig. 4, is constructed to support a vessel of water or any other cooking dish directly over the top of the chimney. The inventor says that he has fried meat in the nicest manner, by placing a frying pan on this stand.

The utility of this invention, if all that is claimed for it by the inventor is sustained, is very great, and the variety of uses to which it can be applied is almost exhaustless. The boiler, Fig. 1, is intended for making tea or coffee in hot weather, though it is well suited for use as a table urn, or for a restaurant heater, or for heating water in barbers' shops, or, in

Telegraphing in the Old World.

The London *Mechanics' Magazine* states, that there are 10,000 miles of telegrah lines in Great Britain, and that there are 12,600 miles of submarine cable laid in various parts of the world. Between London and Algiers there are 600 miles of cable laid at a depth of 1,700 fathoms, which conveys messages regularly at the rate of 14 words per minute. There are eight submarine cables in operation between England and the continent of Europe. These contain thirty conducters, and are of the aggregate length of 1,000 miles. A wonderful feat of telegraphing was executed at a telegraphic soiree given by Mr. Gurney, in London, on the 26th of last March. The wires of the different telegraph companies were brought into Mr. Gurney's house, and from thence the Earl of Shaftsbury sent a message to St. Petersburgh, and received a reply in four minutes. An unbroken circuit of wire, 5,000 miles in length, was then formed to communicate with Verona, Berlin, Brussels, St. Petersburgh, Moscow, Trieste and Venice, and through this great distance the electric message was flashed in the space of two seconds.

Iron Experiment.

A simple illustration will serve to show two facts connected with iron; the first its elasticity, and the second the power exerted by pressure of the hand of any person. Make a hoop of one-inch square bar-iron about the size of the brim of a man's hat, let the inside of the hoop be made quite smooth and true. Such a hoop being examined, it would appear that the power even of a horse could in no way alter its shape or form, provided the strain be put to it fairly and equably. Now make a rod of iron of the thickness of a lead pencil, that shall exactly fit the diameter of the inside of the hoop, so that, when placed in the hoop, it will not fall out unless the hoop be altered in shape. If, acting in a similar way, we took a child's wooden hoop with a stick across it in the center, and then pressed it at the sides opposite to that of the cross stick, the hoop would assume an oval shape, and, of course, the cross stick would fall out. Just so does the iron hoop described act; when any one presses it, the iron rod falls out, showing clearly the elasticity of the iron. The hoop will become oval shaped with a very little pressure, not greater than that which can be exerted by a young girl.—*Septimus Piesse.*

PROSPECTUS

OF THE

SCIENTIFIC AMERICAN.

THE BEST MECHANICAL PAPER IN THE WORLD

EIGHTEENTH YEAR!

VOLUME VII.—NEW SERIES.

A new volume of this widely circulated paper commenced on the 2d of July. Every number contains sixteen pages of useful information, and from five to ten original engravings of new inventions and discoveries, all of which are prepared expressly for its columns.

The SCIENTIFIC AMERICAN is devoted to the interests of Popular Science, the Mechanic Arts, Manufactures, Inventions, Agriculture, Commerce, and the Industrial pursuits generally, and is valuable and instructive not only in the Workshop and Manufactory, but also in the Household, the Library and the Reading Room.

The SCIENTIFIC AMERICAN has the reputation, at home and abroad, of being the best weekly journal devoted to mechanical and industrial pursuits now published, and the proprietors are determined to keep up the reputation they have earned during the seventeen years they have been connected with its publication.

To the Mechanic and Manufacturer!

No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but four cents per week; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but original engravings, and those of the first-class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

Chemists, Architects, Millwrights and Farmers!

The SCIENTIFIC AMERICAN will be found a most useful journal to them. All the new discoveries in the science of chemistry are given in its columns, and the interests of the architect and carpenter are not overlooked; all the new inventions and discoveries appertaining to these pursuits being published from week to week. Useful and practical information pertaining to the interests of millwrights and millowners will be found published in the SCIENTIFIC AMERICAN, which information they cannot possibly obtain from any other source. Subjects in which planters and farmers are interested will be found discussed in the SCIENTIFIC AMERICAN; most of the improvements in agricultural implements being lustrated in its columns

To the Inventor!

The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

TERMS.

To mail subscribers:—Two Dollars a Year, or One Dollar for six months. One Dollar pays for one complete volume of 416 pages; two volumes comprise one year. The volumes commence on the first of JANUARY and JULY.

CLUB RATES.

Five Copies, for Six Months	$4
Ten Copies, for Six Months	8
Ten Copies, for Twelve Months	15
Fifteen Copies, for Twelve Months	22
Twenty Copies, for Twelve Months	28

For all clubs of Twenty and over, the yearly subscription is only $1 40 Names can be sent in at different times and from different Post-office; Specimen copies will be sent gratis to any part of the country.

Western and Canadian money, or Post-office stamps, taken at par for subscriptions. Canadian subscribers will please to remit 25 cents extra on each year's subscription to pre-pay postage.

MUNN & CO., Publishers,
No. 37, Park-row, New York.

FROM THE STEAM PRESS OF JOHN A. GRAY

© 1862 SCIENTIFIC AMERICAN, INC.